Attachment 4
Biological Data Report

American River Watershed Project, California

Long-Term Study
Biological Data Report

September 2001

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SECTION 1

INTRODUCTION AND SUMMARY

The U.S. Army Corps of Engineers (Corps), the State of California Reclamation Board (Reclamation Board), and the Sacramento Area Flood Control Agency (SAFCA) are evaluating proposed plan alternatives for a comprehensive solution to flood control problems associated with the Lower American River watershed and corresponding regions of metropolitan Sacramento. This action is part of the Federally authorized American River Watershed Long-Term Study. The major components of project alternatives include increased flood control protection through levee modification and increasing flood control storage through modification to Folsom Dam and Reservoir. A secondary component is to restore fish and wildlife habitat along the Lower American River.

This biological data report (BDR) addresses potential effects on biological resources of the plan alternatives under evaluation.

BACKGROUND

In February 1986, a series of major storm events in northern California caused record floodflows in the American River basin. Public concern about the effect of these storms led to a series of investigations regarding the adequacy of the existing flood control system on the Lower American River and the need for additional flood protection to the Sacramento area.

In 1991, the Corps, the Reclamation Board, and SAFCA (local sponsors) completed an initial feasibility study for the main stem of the American River and the Natomas Basin. This study identified flood risks in the Sacramento area, evaluated a wide range of flood protection alternatives, and recommended a plan for implementation. Upon completion and review of this report, Congress authorized construction of much of the levee improvement work in the Natomas area and directed that additional studies be conducted to identify a project for increased flood protection along the American River.

In response to congressional direction, the Corps and the local sponsors prepared a Supplemental Information Report (SIR) in 1996 to provide additional information based on the findings of the 1991 feasibility study. The SIR provided a comprehensive analysis that further refined and reformulated flood protection alternatives. The results of this analysis identified three major candidate plans: Folsom Dam Modification Plan, Folsom Stepped Release Plan, and the Detention Dam Plan. Congress again considered the findings of this document and authorized the following Common Features recommended in the SIR as part of the Water Resources Development Act (WRDA) of 1996:

- Levee modification along both banks of the Lower American River

- Levee modification along the east bank of the Sacramento River downstream from the Natomas Cross Canal

- Installation of streamflow gages upstream from Folsom Reservoir and modification to a flood warning system along the Lower American River

- Continued interim reoperation of Folsom Reservoir for variable flood control space

Section 101 of the WRDA of 1999 authorized outlet modifications to Folsom Dam that were generally consistent with the Folsom Dam Modification Plan as identified in the SIR and proposed by SAFCA. In addition, the Common Features project discussed above was modified by the authorization of additional strengthening and raising of levees along the American River and Natomas Cross Canal.

The American River Long-Term Study, authorized by Section 566 of the WRDA of 1999, further supplements the 1991 feasibility report and the 1996 SIR and serves as comprehensive approach to incorporate the findings of previous analysis with the most current available information on proposed alternatives for increasing flood protection for the Lower American River and the Sacramento area.

PROJECT DESCRIPTION

PROJECT ALTERNATIVES

This BDR addresses potential effects on species listed and species proposed for listing under the Federal and State Endangered Species Acts based on the construction and operation of the flood control elements associated with the nine candidate plan alternatives.
The candidates are:

- Alternative 1: No Action
- Alternative 2: 3.5-Foot Dam Raise/478-Foot Flood Pool Elevation
- Alternative 3: Seven-Foot Dam Raise/482-Foot Flood Pool Elevation
- Alternative 4: Twelve-Foot Dam Raise/487-Foot Flood Pool Elevation
- Alternative 5: Stepped Release to 160,000 cfs
- Alternative 6: Stepped Release to 160,000 cfs and New Outlet at Folsom Dam
- Alternative 7: Stepped Release to 180,000 cfs
- Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation
- Alternative 9: Ecosystem Restoration Alternatives

The alternatives are described below.

Alternative 1: No Action

Alternative 1 is representative of without-project conditions and serves as the baseline against which the costs, benefits, and effects of other alternatives in this analysis are evaluated. Under this alternative, the Federal government would take no action to implement a specific plan to increase flood protection along the American River beyond that which is already authorized. Previously authorized flood control projects on the American River include the Common Features Project, the Folsom Dam Modification Project, Folsom Dam Reoperation, and Folsom Dam Flood Management Plan Update.

Alternative 2: 3.5-Foot Dam Raise/478-Foot Flood Pool Elevation

This alternative would enlarging the flood space available in Folsom reservoir from an elevation of 474 to 478 feet above mean sea level (MSL) by raising the height of Folsom Dam and its supporting dikes and levees by approximately 3 feet. This alternative would increase the reservoir's storage capacity to 46,000 acre-feet.

Implementation of this alternative would involve the following components:

- Replacement of existing spillway gates and spillway bridge
- Modification of spillway bridge piers and elevator tower
- Raising of the main concrete dam and wing dams and dikes
- Construction of a parapet wall around portions of Newcastle Powerhouse
- Siting of construction features, including borrow areas and construction staging areas
- Construction of temporary construction bridge below Folsom Dam
- Acquiring of flood easements and land dedications necessary for project implementation

Alternative 3: Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

Implementation of Alternative 3 would increase flood control protection by enlarging the flood space available in Folsom reservoir to an maximum surface elevation of 482 feet above MSL. This would increase the reservoir storage capacity to 96,000 acre-feet. To achieve this elevation, Folsom Dam wing dams and dikes would be raised by approximately 7 feet

The plan components for Alternative 3 are essentially identical to those of Alternative 2 with the exception that an approximately 0.33-mile section of Folsom Dam Road southeast of the left wing dam would be raised in place to an elevation above 482 feet to avoid inundation while Folsom Dam is under flood operations. The wing dams, dikes, and Morman Island Dam embankments would also be raised using fill material.

Alternative 4: Twelve-Foot Dam Raise/487-Foot Flood Pool Elevation

Implementation of Alternative 4 would increase flood control protection by enlarging the flood space available in Folsom Reservoir to a maximum surface elevated 487 feet above MSL. This would increase the reservoir storage capacity to 155,000 acre-feet. To accomplish this, the height of Folsom Dam would be raised by approximately 12 feet.

This plan was developed to represent the maximum feasible amount of dam raise possible before major modifications to the structure would be required, including foundation work and dewatering the reservoir. In addition, preliminary stability analysis indicates that a flood pool elevation greater the 484 feet could cause the dam to become unstable and overturn. To prevent this from happening, additional structural work would be required on the downstream face and possibly in the concrete dam.

The plan components for Alternative 4 are essentially identical to those of Alternative 3.

Alternative 5: Stepped Release to 160,000 cfs

This plan consists of increasing the objective releases from Folsom Dam during floods from 115,000 to 145,000 cfs then stepping flow incrementally to 160,000 cfs depending on the severity of the storm and the storm's effect on storage in Folsom Reservoir. This plan does not include dam safety improvements or other modifications to Folsom Dam.

Implementation of this alternative would involve the following components:

- Strengthening approximately 1 mile of existing levee along the Lower American River and
- Modifying local drainage facilities, water intake facilities, and relocating utilities along the Lower American River
- Modifying the Sacramento Weir, and strengthening levees in the Yolo Bypass, Sacramento River, and tributary sloughs
- Locating and establishing borrow sites and construction staging areas

This plan places a greater emphasis on reducing flood risk by raising the height of levees. Accordingly, although the risk of levee failure is reduced, the initial effects, if levee failure were to occur, would be substantial.

Alternative 6: Stepped Release to 160,000 cfs and New Outlet at Folsom Dam

This plan is a designed to augment features associated with the 160,000-cfs release plan with the addition of new low level outlets at Folsom Dam. The new outlets would be added to the dam to increase the early release capacity from 115,000 cfs to 145,000 cfs. After the

145,000-cfs objective release is met, the release would step up to 160,000 cfs in a similar manner as the under Alternative 5. The higher early release would result in conservation of flood storage during flood events.

Alternative 7: Stepped Release to 180,000 cfs

This plan is similar to Alternative 5 with the exception that the maximum emergency release would be increased to 180,000 cfs. Because the controlled objective release would be increased to 180,000 cfs, the work needed to modify the levees and bridges in the Lower American River is greatly expanded when compared with the 160,000-cfs alternative.

Implementation of this alternative would involve the following components:

- Strengthening existing levees along the Lower American River
- Constructing new levees and floodwalls along the Lower American River
- Modifying bridges along the Lower American River
- Modifying local drainage facilities, water intake facilities, and relocating utilities along the Lower American River
- Locating and establishing borrow sites and construction staging areas
- Modifying the Sacramento Weir and strengthening levees in the Yolo Bypass, Sacramento River, and tributary sloughs.

Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

This alternative provides a high level of flood protection by combining all of the features associated with the 160,000-cfs stepped release alternative (Alternative 5) with those of the seven-foot dam raise/482-foot flood pool elevation alternative (Alternative 3). Features include dam safety and downstream hydraulic mitigation that would be included in Alternative 3.

Alternative 9: Ecosystem Restoration Alternatives

The Corps is also evaluating ecosystem restoration alternatives that includes 4 floodplain ecosystem restoration alternatives and 1 fisheries ecosystem restoration alternative. Four floodplain ecosystem restoration locations along the Lower American River were considered including the Urrutia property, Woodlake, Bushy lake, and Arden Bar. These sites and the fisheries ecosystem restoration alternative are briefly described below.

1. Urrutia Property

The Urrutia property contains some of the highest floodplain in the Lower American River due to the accretion of hydraulic mining debris on the site. This condition has eliminated seasonal wetlands adjacent to the channel used for spawning. Presently this site is in private ownership and used for gravel mining. Mining activities have compacted the soil preventing the regeneration of native riparian forest species. Only narrow strips of habitat remain along Bannon Slough and on the steep banks of the river channel. It is likely the open mining pit harbors warm water fish species and traps native anadromous fish species after over bank flows recede. As a result, there is very minimal habitat value at the site.

Recreating side channels, planting riparian forest and wetland species, lowering the floodplain elevation to allow for more frequent inundation and reducing the potential for native fish stranding in the mining pit are all potential restoration actions that could be undertaken to improve the habitat value of the site.

2. Woodlake

Past agricultural practices at Woodlake cleared most of the vegetation on the site, leaving narrow bands of riparian vegetation along the top of the river bank and along the borrow channels adjacent to the levee and the elevated railroad tracks. Since the abandonment of the haying of the open field at Woodlake, yellow star-thistle has rapidly invaded the site. Many non-native invasive species such as Black locust and Himalayan blackberry have infested the remaining patches of riparian habitat. Much of the condition of the site is owned to the unnaturally high floodplain that is a result of the accretion of hydraulic mining debris and the eventual downcutting of the river channel through this debris.

SAFCA has proposed restoring a portion of this site for splittail habitat. Additional actions which could be undertaken to improve habitat conditions at Woodlake include: eradication of non-native invasive plant species, replanting of native grasses and riparian forest species, expanding the wildlife corridors along the borrow channels. Lowering the floodplain elevation in specific locations would allow the reintroduction of more frequent overbank flows on to the floodplain thus restoring an important natural process to the floodplain. There is also the opportunity to connect restoration actions at Woodlake with proposed habitat improvement actions at the adjacent Urruita and Bushy Lake sites.

3. Bushy Lake

Bushy Lake, although set aside as a state preserve in 1976, has been in a state of ecological decline ever since its boundaries were manipulated as part of a golf course development in the 1980's. Water levels in the lake are sustained only through the pumping of groundwater from Cal Expo. As a result, the water quality is low and riparian vegetation, especially cottonwoods, are not regenerating along its perimeter. Because of the high elevation of the floodplain in relation to the river channel, the natural hydrological processes that would normally support and sustain the plant and wildlife of the floodplain are not present. Much of the

rest of the site suffers from infestations of non-native plant species such as Black locust, Sweet fennel, Yellow Star thistle and Himalyan blackberry.

Restoring a more natural hydrological process to the floodplain using urban stormwater and reshaping the bed and banks of Bushy Lake would allow it to respond more naturally to the seasonal fluctuations in water levels. Shallowly sloped banks would create more room for a cottonwood forest to regenerate. Removing non-native plant species and replanting native riparian forest species would improve the wildlife habitat value of the site.

4. Arden Bar

Much of Arden Bar has been shaped by recent dredger mining activities that have left Arden Pond which is currently stocked for fishing, and several gravel mounds and pits immediately adjacent to the river channel. The gravel mounds have been rapidly infested with Scarlet wisteria, a non-native invasive plant species, and the pits trap native anadromous fish species. The perimeter of the pond itself is infested with Scarlet wisteria and its uniform bank creates very little habitat niches for resident native wildlife species. It is likely that the pond itself traps native anadromous fish species when overbank flows recede. The lack of sediment deposition on the site precludes many native riparian plant species from regenerating on the site and allows non-native, invasive plant species to thrive in the disturbed conditions.

Reshaping Arden Pond to improve its edge habitat will also improve the recreational fishing experience at the site. Aggressively controlling and eradicating non-native invasive plant species and replanting native riparian plant species that can trap sediment on the site will improve the wildlife habitat values of the site.

Fisheries Measure

The fisheries ecosystem restoration alternative for the Lower American River consists of modifications to the intake shutters at Folsom Dam. The purpose of the modifications is to facilitate operational flexibility of the elevation at which water is drawn from Folsom Reservoir into the hydropower penstocks to improve management of the coldwater pool in the reservoir. The modifications would entail reconfiguration and mechanization of the intake shutters to allow efficient changes in the height of the openings of the shutters so that the coldest water closer to the bottom of the reservoir is preserved for release in the warmer seasons of the year. Preservation of the cold water will allow managed releases to more closely match the optimal temperature ranges for various life stages of anadromous fish. Targeted species that would specifically benefit from the project include fall-/late fall-run chinook salmon and Central Valley steelhead.

The intake shutters are configured in stacked gangs of nine 13-foot-high panels. Currently, the panels are grouped in connected units of 3, 2, and 4 panels each. As mitigation for the reoperation of Folsom Reservoir for flood control, the proposed future condition is reconfiguration of the units to 1, 1, 2, 2, and 3. The proposed restoration project is a further improvement to the articulation of the shutters (beyond that required for mitigation) to a configuration of 1, 1, 1, 1, 1, 1, 1, and 2. The proposed restoration also includes mechanization

of the shutters for fast and efficient adjustment. The flexibility provided by the smaller shutter increments will allow preservation of the colder water (near the bottom) by releasing the warmest water (closest to the surface) that is still within the tolerance ranges of anadromous fish.

MITIGATION FEATURES INCORPORATED INTO THE PROJECT

Several mitigation features have been incorporated into each alternative to prevent potential effects and to compensate for unavoidable effects. These features are described below.

Water Quality

- Litter and construction debris will be removed from the floodway and disposed of at an appropriate upland site.

- Any temporary access roads constructed in the floodway or near any body of water will have adequate provisions (e.g., sediment barriers, drainage settling basins) to prevent entry of sediment into the water.

- After project construction, temporary access roads and the temporary construction bridge will be removed, regraded to original contours where feasible, and reseeded with grasses.

- Refueling of equipment and vehicles will occur only in a designated part of the staging areas where potential spills can be readily contained.

- Equipment and vehicles operated in the staging areas in the floodway or near any water bodies will be checked and maintained to prevent leaks of fuels, lubricants, or other fluids.

- Any spills of hazardous material will be cleaned up immediately. Spills will be reported in construction compliance reports.

- Appropriate erosion control measures will be incorporated into the stormwater pollution prevention program.

- All construction material placed in water shall be nontoxic. Any combination of wood, plastic, concrete, or steel is acceptable provided there are no toxic coatings, chemical antifouling products, or other toxic treatments that may leach into the surrounding environment.

- Coffer dams will be used for in-water construction. Water will be removed and routed to either (1) a sedimentation pond located on a flat, stable area that will prevent silt-laden water from reentering the river, ditch, or reservoir or (2) a sedimentation tank/holding

facility that allows only clean water to return to the river and includes disposal of settled solids at an appropriate offsite location.

Aquatic

- A qualified biologist will examine the coffer dam before dewatering. If determined to be appropriate by the biologist, a fish salvage program will be conducted before complete dewatering. The rescued fish will be released downstream of the construction site.

- Construction areas in the Sacramento and Yolo Bypasses will be graded to slope back into the bypass drainage system to provide passage and escape for fish.

OBJECTIVES OF THIS REPORT

This BDR addresses potential effects on species listed and proposed for listing under the Federal and State Endangered Species Acts. The specific objectives of this report are to:

- Identify Federally listed and State-listed species and species that may occur in the project area

- Determine the occurrence of these species and their habitats in areas to be affected by project activities

- Evaluate the potential effects of the proposed action on these species and their habitats, including the potential for take

- If take will occur, identify mitigation measures or other actions that could avoid or minimize effects

This report provides the project sponsors with sufficient information on Federally listed and State-listed species, or species proposed for listing, to prepare a Biological Assessment for consultation with the U.S. Fish and Wildlife Service (Service) and National Marine Fisheries Service (NMFS) under Section 7 of the Federal Endangered Species Act and with the California Department of Fish and Game (DFG) under the California Endangered Species Act (CESA).

SECTION 2

SELECTION OF SPECIES TO BE ADDRESSED

The species addressed in this report were identified from lists provided by the Service and a search of the California Natural Diversity Database (CNDDB). In October 2000, the Service provided a species list that included all of the listed and proposed species with the potential to occur in the project area (Appendix A). The Service provided a subsequent list in February 2001 that included only Sacramento, Sutter, and Yolo Counties (Appendix B). The February 2001 list did not cover all of the areas that may be affected by one or more of the proposed project features.

A CNDDB search was performed in October 2000 for all U.S. Geological Survey (USGS) 7.5-minute quadrangle maps in which the various project features are located (California Natural Diversity Database 2000): Rocklin, Pilot Hill, Gray's Bend, Taylor Monument, Citrus Heights, Folsom, Clarksville, Davis, Sacramento East, Sacramento West, Carmichael, Buffalo Creek, Saxon, Clarksburg, Isleton, and Rio Vista.

Neither the Service's provided lists nor the CNDDB list included a search for listed or proposed species with the potential to occur in the vicinity of the L. L Anderson Dam at French Meadows Reservoir. However, previous reviews and surveys have indicated that no listed or proposed species are known to occur in this area (Hiss and Jenkins 1997).

Project effects were assessed based on the following:

- Type and extent of project activities
- Presence of target species or their habitat
- Documented scarcity and sensitivity of target species

Table 2-1 identifies the listed and proposed species that have the potential to be affected by project-related actions, as well as their status, distribution in California, habitat requirements, and reasons for decline or concern. Species identified in Table 2-1 will be analyzed in more detail in Sections 3 through 15.

Table 2-2 identifies the listed and proposed species that do not occur within the project area or that have no potential to be affected by project-related activities. A summary of the reasons these species will not be analyzed further in this document is provided in Table 2-2, as well as in Section 15.

Table 2-1. Listed and Proposed Species Potentially Affected by the Project and Analyzed in Detail

Species	Source[a]	Status[b] Federal/ State	California Distribution	Habitats	Reason for Decline or Concern	Potential for Effect
Fishes						
Oncorhynchus tshawytscha Winter-run chinook salmon	U.S. Fish and Wildlife Service	E/E	Sacramento and Calaveras Rivers	Riverine; cool, clear water with spawning gravel; migrate to the ocean to feed and grow until sexually mature	Habitat degradation from blockage of adult passage to spawning areas, lethal water temperatures during egg incubation and early rearing	No construction-related effects on the American River or in the Yolo Bypass; potential project effects on aquatic vegetation and existing SRA depending on levee work techniques used in the Delta
Oncorhynchus tshawytscha Central Valley spring-run chinook salmon	U.S. Fish and Wildlife Service	T/T	Sacramento River, Deer, Mill, Butte, and Big Chico Creeks	Cold, clear water with clean gravel of appropriate size for spawning; most spawning occurs in headwater streams; migrate to the ocean to feed and grow until sexually mature	Habitat degradation, restricted access to spawning habitat	No construction-related effects on the American River or in the Yolo Bypass; potential project effects on aquatic vegetation and existing SRA depending on levee work techniques used in the Delta
Oncorhynchus mykiss Central Valley steelhead	U.S. Fish and Wildlife Service	T/--	Sacramento and San Joaquin Rivers and tributaries, including American River	Riverine; cold, clear water with clean gravel of appropriate size for spawning; most spawning occurs in headwater streams; steelhead migrate to the ocean to feed and grow until sexually mature	Habitat degradation, restricted access to spawning habitat; increased water temperatures and sedimentation; decreased water quality; flow alterations	Potential long-term effects on shaded riverine cover habitat depending on bank revetment techniques along the American River

Table 2-1. Continued

Species	Source[a]	Status[b] Federal/ State	California Distribution	Habitats	Reason for Decline or Concern	Potential for Effect
Pogonichthys macrolepidotus Splittail	Both	T/--	Sacramento-San Joaquin Delta	Estuarine or brackish waters to 14 parts per thousand (ppt); spawn in shallow brackish water upstream of the mixing zone (zone of saltwater-freshwater interface) where salinity is around 2 ppt	Reduction in outflows; entrainment losses to diversions; high outflows; change in food organisms; toxic substances; disease; competition; predation; loss of genetic integrity (hybridization with Wakasagi)	Potential project effects on aquatic vegetation and existing SRA depending on levee work techniques used in the Delta
Hypomesus transpacificus Delta smelt	U.S. Fish and Wildlife Service	T/T	Sacramento-San Joaquin River Delta	Estuarine	Water diversions, toxins	Potential project effects on aquatic vegetation and existing SRA depending on levee work techniques used in the Delta
Invertebrates						
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	Both	T/--	Streamside habitats below 3,000 feet through the Central Valley of California	Riparian and oak savanna habitats with elderberry shrubs	Loss and fragmentation of riparian habitats	Occurs in lower and upper American River, Sacramento River, and the Yolo Bypass
Lepidurus packardi Vernal pool tadpole shrimp	Both	E/--	Shasta County south to Merced County	Vernal pools; ephemeral stock ponds	Habitat loss to agriculture and urban development	May occur in the project area, potential effects from construction activities

Table 2-1. Continued

Species	Source[a]	Status[b] Federal/ State	California Distribution	Habitats	Reason for Decline or Concern	Potential for Effect
Branchinecta lynchi Vernal pool fairy shrimp	Both	T/--	Central Valley from Shasta County to Tulare County, along the Coast Ranges from Solano County to Santa Barbara County, and in southern California in Riverside and San Diego Counties	Vernal pools and other seasonal freshwater wetlands	Habitat loss to agriculture and urban development	May occur in the project area, potential effects from construction activities
Reptiles						
Thamnophis gigas Giant garter snake	Both	T/T	Central Valley from Fresno north to the Gridley/Sutter Buttes area; has been extirpated from areas south of Fresno	Sloughs, canals, and other small waterways where there is a prey base of small fish and amphibians; requires grass banks and emergent vegetation for basking and areas of high ground protected from flooding during winter	Loss of habitat from agriculture and urban development	Occurrences in Natomas Basin and the Yolo Bypass
Amphibians						
Rana aurora draytonii California red-legged frog	U.S. Fish and Wildlife Service	T/--	Found along the coast and coastal mountain ranges of California from Humboldt County to San Diego County, and formerly in the Sierra Nevada foothills and midelevations from Butte County to Fresno County	Permanent and semipermanent aquatic habitats, such as creeks and cold water ponds, with emergent and submergent vegetation and riparian species along the edges; may estivate in rodent burrows or cracks during dry periods	Alteration of stream and wetland habitats, overharvesting (historically), habitat destruction, and competition and predation by fish and bullfrogs	May be present in or around Folsom Lake and tributaries Not likely to be affected by project construction activities; potential temporary effects on habitat because of increased water surface elevations in the reservoir

Table 2-1. Continued

Species	Source[a]	Status[b] Federal/ State	California Distribution	Habitats	Reason for Decline or Concern	Potential for Effect
Birds						
Buteo swainsoni (Nesting) Swainson's hawk	Both	--/T	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley; the state's highest nesting densities occur near Davis and Woodland in Yolo County	Nests in oak or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grain fields	Loss of riparian, agriculture and grassland habitats; vulnerable to human disturbance at nest sites	Nests along Sacramento River, Natomas Basin, and the Yolo Bypass Potential direct effects on nest sites because of tree removal, potential disturbance to nest sites and foraging areas
Riparia riparia (nesting) Bank swallow	CNDDB	--/T	The state's largest remaining breeding populations are along the Sacramento River from Tehama County to Sacramento County, and along the Feather and lower American Rivers, in the Owens Valley; nesting areas also include the plains east of the Cascade Range south through Lassen County, northern Siskiyou County, and small populations near the coast from San Francisco to Monterey County	Nests in bluffs or banks, usually adjacent to water, where the soil consists or sand or sandy loam to allow digging	Loss of natural earthen banks to bank protection and flood control; erosion control related to stream regulation by dams	Potential effects on nesting sites along the American River

Table 2-1. Continued

[a] Source explanations

CNDDB = California Natural Diversity Database

U.S. Fish and Wildlife Service = Species list provided by the U.S. Fish and Wildlife Service (October 13, 2000)

[b] Status explanations

Federal

E = listed as endangered under the federal Endangered Species Act.

T = listed as threatened under the federal Endangered Species Act.

PT = proposed for federal listing as threatened under the federal Endangered Species Act.

C = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.

SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.

-- = no listing.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

R = listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.

SSC = species of special concern in California.

-- = no listing.

Table 2-2. Listed and Proposed Species Not Likely to Be Affected by the Project

Species	Source[a]	Status[b] Federal/ State	California Distribution	Habitats	Reason for Decline or Concern	Occurrence in Project Area
Birds						
Branta canadensis leucopareia Aleutian Canada goose	U.S. Fish and Wildlife Service	T/--	The entire population winters in Butte Sink, then moves to Los Banos, Modesto, the Delta, and East Bay reservoirs; stages near Crescent City during spring before migrating to breeding grounds	Roosts in large marshes, flooded fields, stock ponds, and reservoirs; forages in pastures, meadows, and harvested grainfields; corn is especially preferred	Introduction of predators on the breeding grounds; loss of traditional wintering habitat	Rare occurrences in the Yolo Bypass Wintering species not likely to be affected by project construction or seasonal inundation of the bypass
Charadrius alexandrinus nivosus (nesting) Western snowy plover	U.S. Fish and Wildlife Service	T/SSC (Coastal) --/SSC (Inland)	Winters along the coast from Del Norte County to San Diego County: breeding sites within this range are very limited Nests at inland lakes throughout northeastern, central, and southern California	Coastal beaches above the normal high tide limit with wood or other debris for cover Inland shores of salt ponds and alkali or brackish inland lakes	Human disturbance on nesting beaches, feral animal and non-native predator disturbance, loss of habitat	Occasionally nests in the Yolo Bypass Not likely to be affected by construction activities
Charadrius montanus (wintering) Mountain plover	Both	PT/- (wildlife table C/SSC)	Does not breed in California, in winter found in the Central Valley south of Yuba County, along the coast in parts of San Luis Obispo, Santa Barbara, Ventura, and San Diego Counties; parts of Imperial, Riverside, Kern and Los Angeles Counties	Occupies open plains or rolling hills with short grasses or very sparse vegetation; nearby bodies of water are not needed; may use newly plowed or sprouting grainfields	Loss of habitat to agriculture and urban development; declines of California's wintering population may be attributable to disturbance of breeding population	Occasional winter occurrences in the Yolo Bypass Wintering species not likely to be affected by project construction or any changes to seasonal inundation of the bypass

Table 2-2. Continued

Species	Source[a]	Status[b] Federal/ State	California Distribution	Habitats	Reason for Decline or Concern	Occurrence in Project Area
Coccyzus americanus occidentalis (nesting) Western yellow-billed cuckoo	CNDDB	--/E	Nests along the Upper Sacramento River, lower Feather River, south fork of the Kern River, Amargosa, Santa Ana, and Colorado Rivers	Wide dense riparian forests with a thick understory of willows for nesting; sites with a dominant cottonwood overstory are preferred for foraging; may avoid valley oak riparian habitats where scrub jays are abundant	Loss of riparian habitat to agriculture and water control development; possible pesticide contamination	No known occurrences in the project area
Strix occidentalis caurina Northern spotted owl	USFWS	T/SSC	A permanent resident throughout its range; found in the north Coast, Klamath, and western Cascade Range from Del Norte County to Marin County	Dense old-growth forests dominated by conifers with topped trees or oaks available for nesting crevices	Loss of nesting habitat	No habitat present in the project area; no known occurrences in the project area
Haliaeetus leucocephalus (nesting and wintering) Bald eagle	Both	T/E	Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake and Mendocino Counties and in the Lake Tahoe Basin; reintroduced into central coast; winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierras, the east of the Sierra Nevada south of Mono County, range expanding	In western North America nests and roosts in coniferous forests within 1 mile of a lake, reservoir, river or the ocean	Nest sites vulnerable to human disturbance; pesticide contamination	Wintering species not likely to be affected by project construction or any changes to seasonal inundation of the bypass

Table 2-2. Continued

Species	Source[a]	Status[b] Federal/ State	California Distribution	Habitats	Reason for Decline or Concern	Occurrence in Project Area
Invertebrates						
Branchinecta conservatio Conservancy fairy shrimp	U.S. Fish and Wildlife Service	E/	Disjunct occurrences in Solano, Merced, Tehama, Butte, and Glenn Counties	Vernal pools and other seasonal freshwater wetlands	Habitat loss to agriculture and urban development	No occurrences in the project area
Elaphrus viridis Delta green ground beetle	U.S. Fish and Wildlife Service	T/--	Restricted to Olcott Lake and other vernal pools at Jepson Prairie Preserve, Solano County	Sparsely vegetated edges of vernal lakes and pools	Limited range	No known occurrences in the project area
Mammals						
Neotoma fuscipes riparia Riparian (San Joaquin Valley) woodrat	U.S. Fish and Wildlife Service	E/SSC	Known only in Stanislaus and San Joaquin Counties along the San Joaquin, Stanislaus, and Tuolumne Rivers; Caswell State Park, San Joaquin County	Riparian habitats where trees and brush are available for cover and nesting	Loss of riparian habitat, limited range	No known occurrences in the project area
Sylvilagus bachmani riparius Riparian brush rabbit	U.S. Fish and Wildlife Service	E/SSC	Limited to San Joaquin County at Caswell State Park near the confluence of the Stanislaus and San Joaquin Rivers	Dense thickets of brush associated with riparian or chaparral habitats	Clearing and burning of brush, degradation of habitat from grazing and recreational vehicles	No known occurrences in the project area
Plants						
Calystegia stebbinsii Stebbins's Morning-glory	Both	E/E	Fifteen localities in El Dorado County south of the South Fork of the American River, and Nevada County north of the North Fork of the American River	Chaparral and cismontane woodland communities on serpentine and gabbroic substrates	Land development and off-road vehicle use	No occurrences in the project area

Table 2-2. Continued

Species	Source[a]	Status[b] Federal/ State	California Distribution	Habitats	Reason for Decline or Concern	Occurrence in Project Area
Ceanothus roderickii Pine Hill ceanothus	Both	E/R	Sierra foothills and El Dorado County	Chapparal and oak woodland	Residential development	No occurrences in the project area
Cordylanthus palmatus Palmate-bracted bird's-beak	Both	E/E	Delevan National Wildlife Refuge, near the City of Woodland in Yolo County, north of Livermore, and at DFG's Alkali Sink Ecological Reserve in Fresno County	Saline-alkaline soils in seasonally flooded alkali sink scrub habitats	Agricultural conversion and urban development	No occurrences in the project area
Fremontodendron decumbens Pine Hill flannelbush	CNDDB	E/R	Sierra foothills and El Dorado County	Chapparal and oak woodland	Residential development	No occurrences in the project area
Galium californicum ssp *Sierrae* El Dorado bedstraw	Both	E/R	Eight known localities in El Dorado County	Restricted to gabbroic substrates in shaded spots in northern and mixed chapparal and oak woodland	Urbanization, road construction and maintenance, off-road vehicle use, grading, and mining	No occurrences in the project area
Gratiola heterosepala Boggs Lake hedge-hyssop	CNDDB	--/E	Inner north Coast Ranges, Central Sierra Nevada foothills, Sacramento Valley and Modoc Plateau; Fresno, Lake, Lassen, Madera, Modoc, Placer, Sacramento, Shasta, San Joaquin, Solano, and Tehama Counties	Clay soils in areas of shallow water, lake margins and vernal pool margins	Agricultural conversion and urban development	No occurrences in the project area
Neostapfia colusana Colusa grass	Both	T/E	Merced, Solano, and Stanislaus Counties below 7,000 feet	Vernal pools	Agricultural conversion and urban development	No occurrences in the project area

Table 2-2. Continued

Species	Source[a]	Status[b] Federal/ State	California Distribution	Habitats	Reason for Decline or Concern	Occurrence in Project Area
Oenothera deltoides ssp. *Howellii* Antioch Dunes evening-primrose	U.S. Fish and Wildlife Service	E/E	Antioch Dunes, south of the confluence of the Sacramento and San Joaquin Rivers	Loose or semi-stabilized sand	Industrial development, sand mining, and agricultural conversion	No occurrences in the project area
Orcuttia tenuis Slender orcutt grass	Both	T/E	Sierra Nevada and Cascade Range foothills, from Siskiyou County to Sacramento County	Vernal pools, generally between 650–3,600 feet	Agricultural conversion and urban development	No occurrences in the project area
Orcuttia viscida Sacramento orcutt grass	Both	E/E	Endemic to Sacramento County	Vernal pools below 330 feet	Agricultural conversion and urban development	No occurrences in the project area
Pseudobahia bahiifolia Hartweg's golden sunburst	USFWS	E/E/1B	Eastern side of Sacramento-San Joaquin Valleys and adjacent foothills, historically as far north as Yuba County	Predominantly on northern slopes of rocky, bare areas along rolling hills, shady creeks, adjacent to vernal pools and streams, on heavy clay soils in grasslands, 50-500 feet	Agricultural conversion and urban development	No occurrences in the project area; may be extirpated
Senecio layneae Layne's ragwort	Both	T/R	Found only in El Dorado County and in the Red Hills of Tuolomne County	Found primarily in gabbroic and serpentine substrates in northern mixed chapparal, serpentine chapparal, and foothill pine woodland	Road construction and maintenance, off-road vehicle use, and residential development	No occurrences in the project area

Table 2-2. Continued

Species	Source[a]	Status[b] Federal/ State	California Distribution	Habitats	Reason for Decline or Concern	Occurrence in Project Area
Tuctoria mucronata Crampton's tuctoria	Both	E/E	Two known localities, both south of Dixon in Solano County	Clay bottoms of drying vernal pools and lakes surrounded by grasslands	Agricultural conversion	No occurrences in the project area

[a] Source explanations
CNDDB = California Natural Diversity Database.
U.S. Fish and Wildlife Service (a) = Species list provided by the U.S. Fish and Wildlife Service (October 13, 2000).
U.S. Fish and Wildlife Service (b) = Species list provided by the U.S. Fish and Wildlife Service (February 6, 2001).

[b] Status explanations

Federal

E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
PT = proposed for federal listing as threatened under the federal Endangered Species Act.
C = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.
SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.
-- = no listing.

State

E = listed as endangered under the California Endangered Species Act.
T = listed as threatened under the California Endangered Species Act.
R = listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.
SSC = species of special concern in California.
-- = no listing.

SECTION 3

WINTER-RUN CHINOOK SALMON

BACKGROUND

STATUS, DISTRIBUTION, AND LIFE HISTORY

The winter-run chinook salmon is Federally and State listed as endangered (59 FR 440, January 4, 1994). The portion of the Sacramento River from Keswick Dam to Chipps Island, all waters westward from Chipps Island to the Carquinez Strait Bridge, all waters of San Pablo Bay, and all waters of San Francisco Bay north of the San Francisco Oakland Bay Bridge have been designated as critical habitat for winter-run chinook salmon (58 FR 33212, June 16, 1993). Critical habitat includes the river water, river bottom, and adjacent riparian zone (i.e., adjacent terrestrial areas that directly affect a freshwater aquatic ecosystem).

Adult winter-run chinook salmon leave the ocean and migrate through the Sacramento–San Joaquin River Delta (Delta) into the Sacramento River from November through July. Salmon migrate upstream past the Red Bluff Diversion Dam (RBDD) on the Sacramento River from mid-December through July, and most of the spawning population has passed RBDD by late June.

Winter-run chinook salmon spawn from mid-April through August, and incubation continues through October. The primary spawning grounds in the Sacramento River are above RBDD. Some fish may spawn below RBDD, but deleterious temperatures below RBDD kill the eggs during most summers (Fisher pers. comm.).

Juvenile winter-run chinook salmon rear in the Sacramento River from July through March. Juveniles migrate downstream past RBDD from July through March (Hallock and Fisher 1985, Smith pers. comm.). Juveniles have been observed in the Delta from October through December, especially during high Sacramento River discharge caused by fall and early winter storms.

Juvenile chinook salmon move out of upstream spawning areas into downstream habitats in response to many factors, including inherited behavior, habitat availability, flow, competition for space and food, and water temperature. The number of juveniles that moves and the timing of movement are highly variable. Storm events and the resulting high flows cause movement of substantial numbers of juvenile chinook salmon to downstream habitats. During winter and spring flows, juvenile salmon may disperse to accessible flood plain habitat (e.g., Sutter and Yolo Bypasses) where they continue to rear before migrating seaward (California Department of Water Resources 1999). In general, juvenile salmon abundance in the Delta increases as flow increases (U.S. Fish and Wildlife Service 1993a).

Winter-run salmon smolts may migrate through the Delta and the San Francisco Bay to the ocean from December through as late as May (Stevens 1989). Adult winter-run chinook salmon spend 1–3 years in the ocean. Approximately 67 percent of the adult salmon escapement that leaves the ocean to spawn in the Sacramento River consists of 3-year-olds, 25 percent consists of 2-year-olds, and 8 percent consists of 4-year-olds (Hallock and Fisher 1985). The 2-year-olds in the escapement (primarily immature males) are not believed to contribute to spawning success and production of the year class (Fisher pers. comm.).

Shaded riverine aquatic (SRA) cover is an important component of winter-run chinook salmon critical habitat. SRA cover is the nearshore aquatic zone occurring at the interface between the river and adjacent riparian zone. The principal attributes of SRA cover include a) the adjacent bank composed of natural, eroding substrates supporting riparian vegetation that overhangs and/or protrudes into the water; b) woody debris in the water, such as leaves, logs, branches and roots; and c) variable water depths, velocities, and currents (U.S. Fish and Wildlife Service 1993c). SRA cover is particularly important to juvenile salmonids because it moderates stream temperatures during the growing season and provides high-value resting and feeding areas, protection from predators, and shelter from high flows.

REASONS FOR DECLINE

Major factors believed to have contributed to the decline of winter-run chinook salmon include blockage or delays in adult passage to suitable spawning and rearing areas, and lethal water temperatures during egg incubation and early rearing. Other factors that may impede recovery to former levels of abundance and continue to adversely affect winter-run salmon include entrainment loss to diversions, increased predation, the presence of toxic mine waste, diversion from the primary juvenile migration path through the Delta, and ocean fishing.

STATUS IN THE PROJECT AREA

Winter-run chinook salmon do not spawn in the Lower American River, but small numbers of juvenile chinook salmon in the winter-run size range have been caught in the lower reaches (California Department of Fish and Game 1993). This suggests that some winter-run chinook salmon may rear in the Lower American River during their downstream migration in the lower Sacramento River. Based on the general timing of downstream migration in the lower Sacramento River and the Delta, winter-run chinook salmon may occur in the Lower American River from October through May, with the greatest potential for occurrence from December through April. In addition, field studies from 1993 to 1999 in the Sacramento and Yolo Bypasses demonstrated that the bypasses support juvenile winter-run chinook salmon (California Department of Water Resources 1999). Mark-recapture data from releases of tagged chinook salmon fry in the Yolo Bypass flood plain and the mainstem Sacramento River indicate that young salmon that rear in the Bypass grow faster, migrate earlier, and survive better than fish that rear in the river (California Department of Water Resources 1999).

ASSESSMENT METHODS

Assessment of potential effects focuses on 1) the physical changes in habitat that could result from construction associated with levee strengthening and raising, floodwall construction, and increased Sacramento and Yolo Bypass capacity; 2) hydrological changes that could affect the extent and duration of flood plain inundation during the primary winter-run rearing and emigration periods (December–April); and 3) increased flows through the Yolo Bypass during rearing and emigration periods (December–April).

PROJECT EFFECTS

DIRECT EFFECTS

Alternative 1: No Action

Under the No-Action Alternative, no construction activities would occur. Therefore, no direct effects would result.

Alternatives 2–4: Folsom Dam Raise Options

Under these alternatives, Folsom Dam and the surrounding dikes would be raised to provide additional flood storage during peak events. Construction activities would be limited to areas above Nimbus Dam and no major in-river work would be anticipated. Therefore, no direct effects on winter-run chinook salmon or their essential habitat would result.

Alternatives 5–7: Stepped Release Plans

These alternatives each involve construction activities at various locations along levees within the Lower American River and the Sacramento and Yolo Bypasses. No major in-water construction activities are anticipated; therefore, there would be no direct effects associated with construction activity within winter-run rearing or resting habitat. In addition, only limited construction activities would likely occur during winter-run rearing and emigration periods (December–April) because of weather and flow-related limitations on work in the floodway. Because construction activities would be largely limited to modifications to existing levees and flood control structures, no substantial loss of rearing habitat or designated critical habitat would result.

Construction activities have a slight potential to result in minor sedimentation of rearing areas and to release harmful materials (e.g., fuel) into waterways during construction. Mitigation features incorporated into the project to address this potential effect are described in Section 1.

Under Alternative 7, additional work may occur in the floodway of the Lower American River to convey up to 180,000 cfs. This work involves raising existing bridges across the river to

avoid impingement on the increased water surface elevations associated with such flows. Best management practices would be applied to all work within the floodway (see Section 1) and work would generally not occur in the river or in the floodway during periods of potentially high flows (November–April). No effects on winter-run chinook salmon or their essential habitat are anticipated.

Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

This alternative would include both dam raise and stepped release elements (Alternatives 3 and 5). No direct effects would result.

Alternative 9: Ecosystem Restoration Alternatives

These alternatives include construction at 4 floodplain sites (Urrutia, Woodlake, Bushy lake, and Arden Bar) and modernizing the temperature shutters on Folsom Dam. For the 4 floodplain sites, in-water construction will occur at Arden pond and the Urritta mine pit, and Bushy lake will be dewatered; however, these sites are not contiguous, and do not have inlets or outlets, to the Lower American River. The purpose of construction at these sites it to increase habitat values for native fish, wildlife, and plant species by lowering the floodplain, recreating connections to the Lower American River so that anadromous fish do not become stranded during winter overbank flows, and controlling invasive species. Limited work would be done in the Lower American River to connect these sites and only limited construction activities would likely occur during winter-run rearing and emigration periods (December–April) because of weather and flow-related limitations on work in the floodway. Because construction activities would be largely limited to modifications to reshaping and enhancing suitable habitat, no substantial loss of rearing habitat or designated critical habitat would result.

Construction activities have a slight potential to result in minor sedimentation of rearing areas and to release harmful materials (e.g., fuel) into waterways during construction. Mitigation features incorporated into the project to address this potential effect are described in Section 1.

For the fisheries restoration alternative, construction would occur on Folsom Dam, above areas currently suitable for anadromous fish. During the construction period of November through March, the penstocks, and consequentially water releases from the penstocks, will not occur. However, because water temperatures in the Lower American River are within acceptable ranges for winter-run chinook salmon during this period, no loss of rearing habitat or designated critical habitat would result. The purpose of the modifications to the temperature shutters is to improve management of the coldwater pool in the Folsom Reservoir. Preservation of the cold water will allow managed releases to more closely match the optimal temperature ranges for various life stages of anadromous fish and will ultimately benefit winter-run chinook salmon.

INDIRECT EFFECTS

Alternative 1: No Action

Under the No-Action Alternative, no operational changes would result at any project locations. Therefore, no indirect effects would result.

Alternatives 2–4: Folsom Dam Raise Options

Under these alternatives, Folsom Dam and the surrounding dikes would be raised to provide additional flood storage during extreme peak events. This increased storage would be used to store peak flows that could not be safely conveyed in the Lower American River. Once the event had passed, the additional stored water would be released over a relatively short period of time and reservoir storage would be returned to the normal flood pool elevation. Most flow changes (reductions) would occur only during extreme peak events and would be of relatively short duration. In addition, there would be no net effect on the frequency or the volume of reservoir filling and subsequent river flows in the summer and fall. Therefore, no indirect effects on winter-run chinook salmon or their essential habitat are expected.

Alternatives 5–7: Stepped Release Plans

Under these alternatives, peak flows in the Lower American River and the lower Sacramento River would increase as compared to the No-Action Alternative. These increased peak flows would occur infrequently during major storm events. Folsom Reservoir would be managed to the same flood storage rules as under the No-Action Alternative and the stepped release plans would not result in differences in Folsom Reservoir storage. Therefore, no changes in Lower American River summer or fall flows would occur.

There is no evidence to suggest that infrequent, short duration increases in peak flows would have any negative effect on winter-run chinook salmon and, because storage and summer and fall flows would be identical to those of the No-Action Alternative, no impacts on winter-run or their essential habitat are anticipated.

These alternatives also include expansion of the capacity of the Sacramento Weir and Bypass, which allow flows into the Yolo Bypass. During peak flow events, discharges into the Yolo Bypass may be slightly increased under these alternatives, thereby potentially increasing the number of winter-run salmon that are routed through the Yolo Bypass. However, at that same time, large volumes of water would be discharged into the Yolo Bypass through the Fremont Weir and the increase in flows from the Sacramento Weir would have a negligible effect on the number of winter-run salmon routed through the bypass. Additionally, evidence suggests that juvenile salmonids that travel through the bypass have higher survival success than fish that stay in the river system (Sommer et al. 2001). Given the infrequency and short duration of such events, and given information that indicates no harm and perhaps increased survival of winter-run fish that are routed through the bypass, no substantial effects on winter-run or their essential habitat are anticipated.

Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

This alternative would include both dam raise and stepped release elements (Alternatives 3 and 5). No indirect effects would result.

Alternative 9: Ecosystem Restoration Alternatives

These alternatives would include floodplain or fisheries ecosystem restoration alternatives. No indirect effects would result.

INTERRELATED AND INTERDEPENDENT ACTIONS AND THEIR EFFECTS

No interrelated or interdependent actions that would affect listed or proposed species have been identified.

CUMULATIVE EFFECTS

The alternatives would not contribute to any State, local, or private actions that result in cumulative impacts.

MITIGATION AND COMPENSATION MEASURES

None required.

SECTION 4

CENTRAL VALLEY SPRING-RUN CHINOOK SALMON

BACKGROUND

STATUS, DISTRIBUTION, AND LIFE HISTORY

The spring-run chinook salmon evolutionarily significant unit (ESU) is Federally and State listed as threatened (59 FR 13836, March 23, 1994). The ESU includes all naturally spawned populations of spring-run chinook salmon in the Sacramento River and its tributaries. NMFS has designated the Sacramento River and the Delta, as well as Honker, Grizzly, Suisun, and San Francisco Bays as critical habitat for spring-run chinook salmon. Critical habitat includes the river water, river bottom, and adjacent riparian zone.

Most of the spring-run chinook salmon habitat has been eliminated by the development of dams that preclude adults from spawning at the headwaters. Adult distribution is limited to the Sacramento River below Keswick Dam and some tributaries. Although spawning habitat is available for the spring-run fish, they also depend on spatial isolation to prevent competition and hybridization with fall-run chinook salmon (California Department of Fish and Game 1998). The Sacramento River spring-run chinook salmon population has been declining for many decades and demographic and genetic risks resulting from the current small size of the population considered high (California Department of Fish and Game 1998).

Chinook salmon require cold freshwater streams with suitable gravel for reproduction. Females deposit their eggs in nests in gravel-bottom areas of relatively swift water. For maximum survival of incubating eggs and larvae, water temperatures must be between 39EF and 57EF. After emerging, chinook salmon fry tend to seek shallow, nearshore habitat with low water velocities, moving to progressively deeper, faster water as they grow. Spring-run juveniles frequently reside in freshwater habitat for 12–16 months, but many young migrate to the ocean during spring within 5–8 months after hatching. The San Francisco Bay with its surrounding waters and inlets and the Delta are important rearing areas for these migrants.

The time frames of adult winter and spring runs overlap and races are not easily distinguished during the runs (Healey 1991). Spring-run adults enter the San Francisco Bay from November through June. Unlike fall-run chinook that spawn soon after arriving to the spawning grounds, spring-run chinook delay spawning until late August or September in the upper reaches of the mainstem of the Sacramento River and its main tributaries (Healey 1991). Bermann and Quinn (1991) suggest that delays in spawning migration may be a result of habitat selection (coldwater areas) rather than limitations in locating spawning areas because females may increase reproduction success by minimizing energy expenditure before spawning.

Rearing juvenile spring-run require adequate space, cover, and food. Suitable habitat includes areas with instream and overhead cover such as undercut banks, downed trees, and large

overhanging tree branches. The organic materials that form fish cover also help provide sources of food.

Flow conditions in natal streams and the Sacramento River influence juvenile entry into the Delta and ocean. Slow flow conditions impede the juveniles' travel. Juveniles generally migrate downstream from late November to June.

Ocean harvest rates appear to be moderate. Ocean fishery management focuses on the fall run, with no defined management objectives for spring-run salmon. Because of the smaller average size of spring-run salmon and the similarity of their ocean distribution with that of fall-run fish, spring-run harvest rates are probably lower than those for the fall-run.

REASONS FOR DECLINE

Factors related to the decline of spring-run chinook salmon include loss of habitat in river reaches blocked by dams, degradation of habitat conditions (e.g., increase in water temperature), entrainment in water diversions, and overharvest. The human-caused factor that has had the greatest effect on the abundance of spring-run chinook salmon runs is loss of habitat, primarily in the rivers upstream from the Delta. Major dams have blocked upstream access to most chinook salmon habitat in Central Valley rivers and streams and smaller dams contribute to migration delay.

On most Central Valley streams, spring-run chinook salmon are restricted to habitats with marginal water temperature conditions and limited deep holding areas. Water diversions and reservoir operations affect streamflow, which influences the quantity, quality, and distribution of chinook salmon spawning and rearing habitat. Water diversions also reduce the survival of emigrating juvenile salmonids through direct entrainment losses in unscreened or inadequately screened diversions. Predation on emigrating salmonids at diversion dams such as RBDD may also be an important survival factor (U.S. Bureau of Reclamation 1983).

Hybridization may be a more important factor for spring-run than for winter-run salmon because it has been reported that spring-run salmon were likely to have interbred with fall-run fish in the mainstem Sacramento and Feather Rivers. The extent of hybridization is unknown, however (Reynolds et al. 1993).

STATUS IN THE PROJECT AREA

There is no evidence that spring-run chinook salmon use the Lower American River for spawning, but they may temporarily use the Lower American River during outmigration as do winter-run chinook salmon. The spring-run adults and juveniles use the lower Sacramento River for migration and juveniles also use it for rearing prior to migration to the ocean. Juvenile spring-run chinook salmon also use the Sacramento and Yolo Bypasses for rearing and migration (California Department of Water Resources 1999).

ASSESSMENT METHODS

Assessment of potential effects focuses on 1) the physical changes in habitat that could result from construction associated with levee strengthening and raising, floodwall construction, and increased Sacramento and Yolo Bypass capacity; 2) hydrological changes that could affect the extent and duration of flood plain inundation during the primary steelhead rearing and emigration periods; and 3) increased flows through the Yolo Bypass during winter and spring flood periods.

PROJECT EFFECTS

DIRECT EFFECTS

Alternative 1: No Action

Under the No-Action Alternative, no construction activities would occur. Therefore, no direct effects would result.

Alternatives 2–4: Folsom Dam Raise Options

Under these alternatives, Folsom Dam and the surrounding dikes would be raised to provide additional flood storage during peak events. Construction activities would be limited to areas above Nimbus Dam, and no major in-river work would be anticipated. Therefore, no direct effects on spring-run chinook salmon or their essential habitat would result.

Alternatives 5–7: Stepped Release Plans

These alternatives each involve construction activities at various locations along levees in the Lower American River and the Sacramento and Yolo Bypasses. No major in-water construction activities are anticipated; therefore, there would be no direct effects associated with construction activity within spring-run rearing or resting habitat. In addition, only limited construction activities would likely occur during spring-run rearing and emigration periods (November–June) because of weather and flow-related limitations on work in the floodway. Because construction activities would be largely limited to modifications to existing levees and flood control structures, no substantial loss of rearing habitat or designated critical habitat would result.

Construction activities have a slight potential to result in minor sedimentation of rearing areas and to release harmful materials (e.g., fuel) into waterways during construction. Mitigation features incorporated into the project to address this potential effect are described in Section 1.

Under Alternative 7, additional work may occur in the floodway of the Lower American River to convey up to 180,000 cfs. This work involves raising existing bridges across the river to

avoid impingement on the increased water surface elevations associated with such flows. Best management practices would be applied to all work in the floodway (see Section 1), and work generally would not occur in the river or in the floodway during periods of potentially high flows (November–April). No effects on spring-run chinook salmon or their essential habitat are anticipated.

Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

This alternative would include both dam raise and stepped release elements (Alternatives 3 and 5). No direct effects would result.

Alternative 9: Ecosystem Restoration Alternatives

These alternatives include construction at 4 floodplain sites (Urrutia, Woodlake, Bushy lake, and Arden Bar) or on the temperature shutters on Folsom Dam. For the 4 floodplain sites, in-water construction will occur at Arden pond and the Urritta mine pit, and Bushy lake will be dewatered; however, these sites are not contiguous, and do not have inlets or outlets, to the Lower American River. The purpose of construction at these sites it to increase habitat values for native fish, wildlife, and plant species by lowering the floodplain, recreating connections to the Lower American River so that anadromous fish do not become stranded during winter overbank flows, and controlling invasive species. Limited work would be done in the Lower American River to connect these sites and only limited construction activities would likely occur during spring-run rearing and emigration periods (November–June) because of weather and flow-related limitations on work in the floodway. Because construction activities would be largely limited to modifications to reshaping and enhancing suitable habitat, no substantial loss of rearing habitat or designated critical habitat would result.

Construction activities have a slight potential to result in minor sedimentation of rearing areas and to release harmful materials (e.g., fuel) into waterways during construction. Mitigation features incorporated into the project to address this potential effect are described in Section 1.

For the fisheries restoration alternative, construction would occur on Folsom Dam, above areas currently suitable for anadromous fish. During the construction period of November through March, the penstocks, and consequentially water releases from the penstocks, will not occur. However, because water temperatures in the Lower American River are within acceptable ranges for spring-run chinook salmon during this period, no loss of rearing habitat or designated critical habitat would result. The purpose of the modifications to the temperature shutters is to improve management of the coldwater pool in the Folsom Reservoir. Preservation of the cold water will allow managed releases to more closely match the optimal temperature ranges for various life stages of anadromous fish and will ultimately benefit Central Valley spring-run chinook salmon.

INDIRECT EFFECTS

Alternative 1: No Action

Under the No-Action Alternative, no operational changes would result at any project locations. Therefore, no indirect effects would result.

Alternatives 2–4: Folsom Dam Raise Options

Under these alternatives, Folsom Dam and the surrounding dikes would be raised to provide additional flood storage during extreme peak events. This increased storage would be used to store peak flows that could not be safely conveyed in the Lower American River. After the event had passed, the additional stored water would be released over a relatively short period of time, and reservoir storage would be returned to the normal flood pool elevation. Most flow changes (reductions) would occur only during extreme peak events and would be of relatively short duration. In addition, there would be no net effect on the frequency or the volume of reservoir filling and subsequent river flows in the summer and fall. Therefore, no indirect effects on spring-run chinook salmon or their essential habitat are expected.

Alternatives 5–7: Stepped Release Plans

Under these alternatives, peak flows in the Lower American River and the Lower Sacramento River would increase as compared to the No-Action Alternative. These increased peak flows would occur infrequently during major storm events. Folsom Reservoir would be managed to the same flood storage rules as under the No-Action Alternative, and the stepped release plans would not result in differences in Folsom Reservoir storage. Therefore, no changes in Lower American River summer or fall flows would occur.

There is no evidence to suggest that infrequent, short-duration increases in peak flows would have any negative effect on spring-run chinook salmon, and because storage and summer and fall flows would be identical to those under the No-Action Alternative, no impacts on spring-run or their essential habitat are anticipated.

These alternatives also include expanding the capacity of the Sacramento Weir and Bypass, which allow flows into the Yolo Bypass. During peak flow events, discharges into the Yolo Bypass may be slightly increased under these alternatives, thereby potentially increasing the number of spring-run salmon that are routed through the Yolo Bypass. However, at that same time, large volumes of water would be discharged into the Yolo Bypass through the Fremont Weir and the increase in flows from the Sacramento Weir would have a negligible effect on the number of spring-run salmon routed through the bypass. Additionally, evidence suggests that juvenile salmonids that travel through the bypass have higher survival success than fish that stay in the river system (Sommer et al. 2001). Given the infrequency and short duration of such events, and given information that indicates no harm and perhaps increased survival of spring-run fish that are routed through the bypass, no substantial effects on spring-run chinook salmon or their essential habitat are anticipated.

Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

This alternative would include both dam raise and stepped release elements (Alternatives 3 and 5). No indirect effects would result.

Alternative 9: Ecosystem Restoration Alternatives

These alternatives would include floodplain or fisheries ecosystem restoration alternatives. No indirect effects would result.

INTERRELATED AND INTERDEPENDENT ACTIONS AND THEIR EFFECTS

No interrelated or interdependent actions that would affect listed or proposed species have been identified.

CUMULATIVE EFFECTS

The alternatives would not contribute to any State, local, or private actions that result in cumulative impacts.

MITIGATION AND COMPENSATION MEASURES

None required.

SECTION 5

STEELHEAD

BACKGROUND

STATUS, DISTRIBUTION, AND LIFE HISTORY

Central Valley steelhead was Federally listed as a threatened species on March 19, 1998 (63 FR 32996-32998, March 19, 1998). The ESU includes all naturally spawned populations of steelhead (and their progeny) in the Sacramento and San Joaquin Rivers and their tributaries. Steelhead from San Francisco and San Pablo Bays and their tributaries are excluded. On February 16, 2000, NMFS designated the Central Valley steelhead's critical habitat to include all river reaches accessible to listed steelhead in the Sacramento and San Joaquin Rivers and their tributaries in California (65 FR 7764-7787, February 16, 2000). The critical habitat also includes adjacent riparian zones, as well as river reaches and estuarine areas of the Delta; all waters from Chipps Island westward to Carquinez Bridge, (including Honker, Grizzly, Suisun Bays and Carquinez Strait); all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay (north of the San Francisco Oakland Bay Bridge) from San Pablo Bay to Golden Gate Bridge. Excluded are areas of the San Joaquin River upstream of the Merced River confluence, tribal lands, and areas above specific dams or above longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years).

Adult steelhead return to spawn in the Sacramento River and its tributaries after 1–3 years of ocean residence. Upstream migration in the Lower American River ranges from November to April and peaks in January (Jones & Stokes 2000). Spawning usually takes place from late December to March, but can range from November through April (Jones & Stokes 2000).

Steelhead fry emerge from riverbed gravel nests 2–8 weeks after hatching, usually during April and May (Barnhart and Parsons 1986, McEwan and Nelson 1991, Reynolds et al. 1993). Juveniles rear in the rivers through summer and migrate downstream to the ocean during November to May. Fry generally remain in their natal river or stream (Schaffter 1980).

Steelhead have been collected during nearly every month at the State Water Project (SWP) and the Central Valley Project (CVP) Delta pumping facilities. Peak salvage at the SWP and CVP facilities occurs primarily during March and April. Migration timing is similar to the timing of the seaward migration of winter-run chinook salmon, although water temperature and riverflow affect the timing of juvenile steelhead migration through the Delta.

Adult steelhead trout enter the Lower American River from November through April, with peak abundance typically occurring in January. Spawning occurs primarily from January through March. Steelhead fry emerge from riverbed gravel nests from March through May. Unlike chinook salmon, steelhead trout juveniles are present year-round in the Lower American

River, rearing in the river for 1–2 years before emigrating from the river as smolts, typically from March through June.

REASONS FOR DECLINE

As with winter-run chinook salmon, the primary human-caused factors influencing steelhead trout abundance are activities upstream from the Delta (e.g., dam closure, elevated water temperature, and diversions). Delta diversions have contributed to the increased mortality of juvenile steelhead trout during their migration through the Delta.

Ongoing factors affecting the mortality of steelhead trout include deleterious water temperatures in spawning and rearing habitat, delay of juvenile migration, increased predation during juvenile migration, and entrainment of juveniles in diversions. All of these problems have resulted from the construction and operation of facilities for water diversions, water storage, agricultural drainage, and flood control, both on the Sacramento River and its tributaries and in the Delta.

In summary, habitat degradation has reduced the population of steelhead trout. Major factors are blockage of adult passage to suitable spawning and rearing areas and lethal water temperatures during egg incubation and early rearing. Other factors that may impede recovery to former levels of abundance and continue to adversely affect steelhead trout include entrainment loss to diversions, in-river sport fishing, increased predation, the presence of toxic mine waste, and diversion of the primary juvenile migration path through the Delta.

STATUS IN THE PROJECT AREA

The project area is within the designated critical habitat area for Central Valley steelhead trout. Adult and juvenile steelhead use the Sacramento River as a migration path primarily during winter and spring. Because of their need for suitable water temperatures throughout the year, most steelhead rear upstream from the project area. The majority of steelhead in the American River are hatchery produced, and many of the steelhead produced at Coleman National and Feather River Fish Hatcheries stray and return to the American River. Steelhead may also occur in the Sutter, Yolo, and Sacramento Bypasses as migrating adults or juveniles during winter and spring flood periods.

ASSESSMENT METHODS

Assessment of potential effects focuses on 1) the physical changes in habitat that could result from construction associated with levee strengthening and raising, floodwall construction, and increased Sacramento and Yolo Bypass capacity; 2) hydrological changes that could affect the extent and duration of flood plain inundation during the primary steelhead rearing and

emigration periods; and 3) increased flows through the Yolo Bypass during winter and spring flood periods.

PROJECT EFFECTS

DIRECT EFFECTS

Alternative 1: No Action

Under the No-Action Alternative, no construction activities would occur. Therefore, no direct effects would result.

Alternatives 2–4: Folsom Dam Raise Options

Under these alternatives, Folsom Dam and the surrounding dikes would be raised to provide additional flood storage during peak events. Construction activities would be limited to areas above Nimbus Dam and no major in-river work is anticipated. Therefore, no direct effects on steelhead or their essential habitat would result.

Alternatives 5–7: Stepped Release Plans

These alternatives each involve construction activities at various locations along levees within the Lower American River and the Sacramento and Yolo Bypasses. No major in-water construction activities are anticipated; therefore, there would be no direct effects associated with construction activity within steelhead spawning or rearing habitat. In addition, only limited construction activities would likely occur during steelhead spawning and emergence periods (January–May) because of weather and flow-related limitations for work in the floodway. Because construction activities would be largely limited to modifications to existing levees and flood control structures, no substantial loss of rearing habitat or designated critical habitat would result.

Construction activities have a slight potential to result in minor sedimentation of rearing areas and to release harmful materials (e.g., fuel) into waterways during construction. Mitigation features incorporated into the project to address this potential effect are described in Section 1.

Under Alternative 7, additional work may occur in the floodway of the Lower American River to convey up to 180,000 cfs. This work would involve raising existing bridges across the river to avoid impingement on the increased water surface elevations associated with such flows. Best management practices would be applied to all work within the floodway and work would generally not occur in the river or in the floodway during periods of potentially high flows (November–April). No effects on steelhead or their essential habitat are anticipated.

Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

This alternative would include both dam raise and stepped release elements (Alternatives 3 and 5). No direct effects would result.

Alternative 9: Ecosystem Restoration Alternatives

These alternatives include construction at 4 floodplain sites (Urrutia, Woodlake, Bushy lake, and Arden Bar) or on the temperature shutters on Folsom Dam. For the 4 floodplain sites, in-water construction will occur at Arden pond and the Urritta mine pit, and Bushy lake will be dewatered; however, these sites are not contiguous, and do not have inlets or outlets, to the Lower American River. The purpose of construction at these sites it to increase habitat values for native fish, wildlife, and plant species by lowering the floodplain, recreating connections to the Lower American River so that anadromous fish do not become stranded during winter overbank flows, and controlling invasive species. Limited work would be done in the Lower American River to connect these sites and only limited construction activities would likely occur during steelhead spawning and emergence periods (January–May) because of weather and flow-related limitations on work in the floodway. Because construction activities would be largely limited to modifications to reshaping and enhancing suitable habitat, no substantial loss of rearing habitat or designated critical habitat would result.

Construction activities have a slight potential to result in minor sedimentation of rearing areas and to release harmful materials (e.g., fuel) into waterways during construction. Mitigation features incorporated into the project to address this potential effect are described in Section 1.

For the fisheries restoration alternative, construction would occur on Folsom Dam, above areas currently suitable for anadromous fish. During the construction period of November through March, the penstocks, and consequentially water releases from the penstocks, will not occur. However, because water temperatures in the Lower American River are within acceptable ranges for steelhead during this period, no loss of rearing habitat or designated critical habitat would result. The purpose of the modifications to the temperature shutters is to improve management of the coldwater pool in the Folsom Reservoir. Preservation of the cold water will allow managed releases to more closely match the optimal temperature ranges for various life stages of anadromous fish and will ultimately benefit steelhead.

INDIRECT EFFECTS

Alternative 1: No Action

Under the No-Action Alternative, no operational changes would result at any project locations. Therefore, no indirect effects would result.

Alternatives 2–4: Folsom Dam Raise Options

Under these alternatives, Folsom Dam and the surrounding dikes would be raised to provide additional flood storage during extreme peak events. This increased storage would be used to store peak flows that could not be safely conveyed in the Lower American River. Once the event had passed, the additional stored water would be released over a relatively short period of time and reservoir storage would be returned to the normal flood pool elevation. Most flow changes (reductions) would occur only during extreme peak events and would be of relatively short duration. In addition, there would be no net effect on the frequency or the volume of reservoir filling and subsequent river flows in the summer and fall. Therefore, no indirect effects on steelhead or their essential habitat are expected.

The availability and quality of spawning habitat is a long-term concern in the Lower American River. The USFWS addressed this concern in its Revised Draft Fish and Wildlife Coordination Act Report for the American River Watershed Investigation, Folsom Dam Outlet Modification Project, California (U.S. Fish and Wildlife Service 2001). This discussion summarizes and further extrapolates from the conclusions reached in that report.

Since the construction of upstream dams, including Folsom and Nimbus Dams, the sediment supply to the Lower American River has been eliminated, the river has incised, and cobbles suitable for salmonid spawning have been moved downstream. In addition, the Lower American River shows the typical armoring effect of dams, where sediment-free water strips away the finer material at the substrate surface, leaving larger pebble sizes at or just below the surface. These processes are believed to be ongoing. For example, during January 1997, a 2-day peak flow event of 105,000-109,000 apparently resulted in significant gravel movement and grade changes at the five most important chinook salmon spawning areas, based on surveys conducted by USFWS before and after this event.

Given the ongoing nature of sediment movement, the lack of information about how high flows affect sediment movement, the uncertainty of predicting future hydrology, the array of possible operational rules that could be employed, and inability to accurately model specific hydrologic events, there is no information to suggest that the alternatives would result in any substantial changes in spawning habitat availability or quality as compared to either existing conditions or the No-Action Alternative.

Alternatives 5–7: Stepped Release Plans

Under these alternatives, peak flows in the Lower American River and the lower Sacramento River would increase as compared to the No-Action Alternative. These increased peak flows would occur infrequently during major storm events. Folsom Reservoir would be managed to the same flood storage rules as under the No-Action Alternative and the stepped release plans would not result in differences in Folsom Reservoir storage. Therefore, no changes in Lower American River summer or fall flows would occur.

There is no evidence to suggest that infrequent, short duration increases in peak flows would have any negative effect on steelhead and because storage and summer and fall flows (and

therefore temperature) would be identical to those of the No-Action Alternative, no impacts on steelhead or their essential habitat are anticipated.

Fish stranding in water bodies (i.e., ponds) in the floodway but isolated from the channel at lower flows or on land has also been identified as a potential issue in the Lower American River. Typically, the potential for stranding fish would increase with the magnitude and frequency of higher flows. However, because of the confined nature of the Lower American River, even moderate flows (e.g., 10-year events) span the full width of the levee even in the lower reaches of the river. Therefore, although there may be an increase in the magnitude and duration of higher flows under the alternatives, the potential for stranding would not be increased. Potential effects on spawning habitat suitability are similar to those described above.

These alternatives also include expansion of the capacity of the Sacramento Weir and Bypass that allows flows into the Yolo Bypass. During peak flow events, discharges into the Yolo Bypass may be slightly increased under these alternatives, thereby potentially increasing the number of steelhead that occur in the Yolo Bypass. However, at that same time, large volumes of water would be discharged into the Yolo Bypass through the Fremont Weir and the increase in flows from the Sacramento Weir would be negligible. Additionally, evidence suggests that juvenile salmonids that travel through the bypass have higher survival success than fish that stay in the river system (Sommer et al. 2001). Given the infrequency and short duration of such events, and given information that indicates no harm and perhaps increased survival of winter-run steelhead that are routed through the bypass, no substantial effects on steelhead or their essential habitat are anticipated.

Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

This alternative would include both dam raise and stepped release elements (Alternatives 3 and 5). No indirect effects would result.

Alternative 9: Ecosystem Restoration Alternatives

These alternatives would include floodplain or fisheries ecosystem restoration alternatives. No indirect effects would result.

INTERRELATED AND INTERDEPENDENT ACTIONS AND THEIR EFFECTS

No interrelated or interdependent actions that would affect listed or proposed species have been identified.

CUMULATIVE EFFECTS

The alternatives would not contribute to any State, local, or private actions that result in cumulative impacts.

MITIGATION AND COMPENSATION MEASURES

None required.

SECTION 6

SPLITTAIL

BACKGROUND

STATUS, DISTRIBUTION, AND LIFE HISTORY

The splittail is Federally listed as threatened (64 FR 5963-5981, February 8, 1999). This species is not State listed and no critical habitat has been designated.

Splittail are largely confined to the Delta, Suisun Bay, Suisun Marsh, and Napa Marsh and are rarely found more than 5–10 miles above the upstream boundaries of the Delta (Moyle et al. 1989, Natural Heritage Institute 1992). Historically, they ranged much farther upstream in the Sacramento and San Joaquin Rivers and their tributaries. The Service has found that splittail are abundant in Suisun and Grizzly Bays (59 FR 862, January 6, 1994). Since 1985, splittail have been rare in San Pablo Bay, indicating that their range may be declining further. Splittail are also abundant in the western and northern part of the Delta (Moyle et al. 1989). In recent years, splittail distribution appears to have shifted to the lower Sacramento River and south Delta (59 FR 862). Incidental catches of large splittail in fyke traps set by DFG to catch spring migrating striped bass in the lower Sacramento River indicate that splittail may migrate from lower river reaches to upstream spawning habitats.

Splittail are freshwater fish capable of tolerating moderate levels of salinity (10–18 parts per thousand [ppt]) (59 FR 862). They grow to as long as 40 centimeters (cm) and live as long as 5 years. The diet of adults and juveniles includes decayed organic material; earthworms, clams, insect larvae, and other invertebrates; and fish. The mysid *Neomysis mercedis* is a primary prey species, although decayed organic material constitutes a larger percentage of the stomach contents of the splittail (Daniels and Moyle 1983).

Both male and female splittail become sexually mature by their second winter, when they are about 10 cm long. Female splittail are capable of producing over 100,000 eggs per year (Daniels and Moyle 1983, Moyle et al. 1989). Splittail deposit adhesive eggs on flooded streambanks or aquatic vegetation when water temperatures are between 9^{o}C and 20^{o}C (Moyle 1976, Wang 1986). They spawn in late April and May in Suisun Marsh and between early March and May in the upper Delta and lower reaches of the Sacramento and San Joaquin Rivers (Moyle et al. 1989). Spawning has been observed as early as January and as late as July (Wang 1986).

Larval splittail are commonly found in the shallow, weedy areas where spawning occurs. Larvae eventually move into deeper, open water habitats as they grow and become juveniles. During late winter and spring, young-of-year juvenile splittail (i.e., less than 1 year old) are found in sloughs, rivers, and Delta channels near spawning habitat. Juvenile splittail gradually move from shallow, nearshore habitats to the deeper, open water habitats of Suisun and San Pablo Bays (Wang 1986).

In areas upstream of the Delta, juvenile splittail can be expected to be present in the flood basins (i.e., Sutter and Yolo Bypasses and the Sacramento River) (Jones & Stokes Associates 1993).

Adult access to flooded terrestrial habitats for foraging and spawning is believed to be necessary for the production of strong year classes of splittail. A significant positive correlation exists between splittail year-class strength (i.e., young-of-the-year abundance) and Sacramento Riverflow during the spawning season (Daniels and Moyle 1983, Meng and Moyle 1995). This relationship may reflect improved splittail foraging and spawning success associated with the availability of flooded terrestrial habitat in wet years (Caywood 1974), as suggested by a positive correlation between young-of-the-year abundance and flooding (i.e., days of continuous inundation) in the Yolo and Sutter Bypasses (Sommer et al. 1997). Changes in the timing, magnitude, and duration of high flows affect the availability of flood plain habitat which, in turn, is believed to affect when and where adults migrate and, consequently, when and where spawning and early rearing occurs (Sommer et al. 1997, California Department of Fish and Game 1998).

REASONS FOR DECLINE

Reduced Delta outflow, entrainment in diversions, dams and reservoirs, pollution, agricultural development, introduced aquatic species, loss of wetlands and shallow-water habitats, and the recent drought may have contributed to the apparent decline in splittail distribution and abundance (U.S. Fish and Wildlife Service 1993b, Moyle et al. 1989).

Habitat modification is probably the largest factor contributing to the decline of the splittail (California Department of Fish and Game 1992). Water diversions, land reclamation, flood control, and agricultural developments have eliminated and drastically altered much of the historic splittail habitat in the lowland areas, and dams have restricted access to spawning areas and upstream habitats. The Service estimates that diking and dredging have eliminated approximately 96 percent of the wetland habitats that splittail apparently require (59 FR 862, January 6, 1994). (Most diking and filling of wetlands preceded the recent decline in splittail abundance.) However, in the past 20 years, only relatively small habitat areas have been lost to levee riprapping and wetland filling.

Year-class survival is affected by Delta outflow, possibly because spawning success depends on spawning habitat availability (Moyle et al. 1989). Upstream storage reservoirs and diversions may reduce the frequency and magnitude of floodflows, thereby affecting the availability of flooded vegetation during the spawning season.

Agricultural diversions entrain adult and juvenile fish. Peak salvage at the CVP and SWP fish protection facilities occurs during the months of May, June, and July. Adult fish are salvaged primarily during January, March, and April. Annual progeny generally first appear in salvage operation facilities during April, when they are about 40 millimeters (mm) long. Although larvae are entrained, vulnerability of larvae to entrainment is unknown. Most larvae rear near the spawning area, thereby avoiding exposure to more distant diversions. Diversions

appear to entrain primarily young-of-the-year juveniles and sexually mature fish; few yearling splittail are salvaged.

Pollution (from sources including agricultural runoff, sewage discharge, industrial discharge, and nonpoint runoff) has altered water quality in the estuary, possibly reducing the rate of splittail survival. The channelization of rivers and Delta waterways has reduced habitat availability.

STATUS IN THE PROJECT AREA

Splittail are largely confined to the Delta, Suisun Bay, Suisun Marsh, Napa River, Petaluma River, and other parts of the Sacramento-San Joaquin estuary. During their spawning migration (January–April), adult splittail may disperse upstream to spawning areas in the lower Sacramento and San Joaquin Rivers. The Yolo and Sutter Bypasses appear to be important splittail spawning areas, especially in wet years when the Bypasses are continuously flooded for at least 1 month during the primary splittail spawning and early rearing period (February–May) (Sommer et al. 1997). The extent to which splittail use the Lower American River for spawning and early rearing is unknown. Small numbers of splittail have been captured in recent years during fish community surveys and in DFG's fish trap located near the Watt Avenue Bridge in Sacramento. The presence of this species in this area indicates that a portion of the population migrates into the Lower American River to spawn in late winter and early spring. Generally, splittail use shallow areas with flooded vegetation in and above the Delta for spawning and early rearing habitat. The quantity of this type of habitat is limited in the Lower American River because much of the existing flood plain is restricted to relatively narrow remnant berms between the main river channel and levees. The greatest potential for splittail spawning exists downstream from Mile 5 of the Lower American River where the flood plain is widest and is subject to the backwater influence of the Sacramento River during flood events.

ASSESSMENT METHODS

Assessment of potential effects focuses on 1) the physical changes in habitat that could result from construction associated with levee strengthening and raising, floodwall construction, and increased Sacramento and Yolo Bypass capacity; 2) hydrological changes that could affect the extent and duration of flood plain inundation and spawning habitat during the primary splittail spawning period; 3) increased flows through the Yolo Bypass during winter and spring flood periods.

PROJECT EFFECTS

DIRECT EFFECTS

Alternative 1: No Action

Under the No-Action Alternative, no construction activities would occur. Therefore, no direct effects would result.

Alternatives 2–4: Folsom Dam Raise Options

Under these alternatives, Folsom Dam and the surrounding dikes would be raised to provide additional flood storage during peak events. Construction activities would be limited to areas above Nimbus Dam and no major in-river work is anticipated. Therefore, no direct effects on splittail would result.

Alternatives 5–7: Stepped Release Plans

These alternatives each involve construction activities at various locations along levees within the Lower American River and the Sacramento and Yolo Bypasses. No major in-water construction activities are anticipated. Therefore, no direct effects associated with construction activity within splittail spawning or rearing habitat would result. In addition, only limited construction activities would likely occur during the primary splittail spawning period (January–April) because of weather and flow-related limitations for work in the floodway. Because construction activities would be largely limited to modifications to existing levees and flood control structures, no substantial loss of rearing habitat would result.

Construction activities have a slight potential to result in minor sedimentation of rearing areas and to release harmful materials (e.g., fuel) into waterways during construction. Mitigation features incorporated into the project to address this potential effect are described in Section 1.

Under Alternative 7, additional work may occur in the floodway of the Lower American River to convey up to 180,000 cfs. This work involves raising existing bridges across the river so as not to impinge on the increased water surface elevations associated with such flows. Best management practices would be applied to all work within the floodway (see Section 1) and work would generally not occur in the river or in the floodway during periods of potentially high flows (November–April). Therefore, no effects on splittail are anticipated.

Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

This alternative would include both dam raise and stepped release elements (Alternatives 3 and 5). No direct effects would result.

Alternative 9: Ecosystem Restoration Alternatives

These alternatives include construction at 4 floodplain sites (Urrutia, Woodlake, Bushy lake, and Arden Bar) or on the temperature shutters on Folsom Dam. For the 4 floodplain sites, in-water construction will occur at Arden pond and the Urritta mine pit, and Bushy lake will be dewatered; however, these sites are not contiguous, and do not have inlets or outlets, to the Lower American River. The purpose of construction at these sites it to increase habitat values for native fish, wildlife, and plant species by lowering the floodplain, recreating connections to the Lower American River, and controlling invasive species. Restoration work at the Woodlake site could create new opportunities for splittail habitat. Limited work would be done in the Lower American River to connect these sites and only limited construction activities would likely occur during splittail spawning period (January–April) because of weather and flow-related limitations on work in the floodway. Because construction activities would be largely limited to modifications to reshaping and enhancing suitable habitat, no substantial loss of rearing habitat would result.

Construction activities have a slight potential to result in minor sedimentation of rearing areas and to release harmful materials (e.g., fuel) into waterways during construction. Mitigation features incorporated into the project to address this potential effect are described in Section 1.

For the fisheries restoration alternative, construction would occur on Folsom Dam, above areas currently suitable for splittail. Therefore, no effects on splittail are anticipated.

INDIRECT EFFECTS

Alternative 1: No Action

Under the No-Action Alternative, no operational changes would result at any project locations. Therefore, no indirect effects would result.

Alternatives 2–4: Folsom Dam Raise Options

Under these alternatives, Folsom Dam and the surrounding dikes would be raised to provide additional flood storage during extreme peak events. This increased storage would be used to store peak flows that could not be safely conveyed in the Lower American River. Once the event had passed, the additional stored water would be released over a relatively short period of time and reservoir storage would be returned to the normal flood pool elevation. Most flow changes (reductions) would occur only during extreme peak events and would be of relatively short duration. In addition, there would be no net effect on the frequency or the volume of reservoir filling and subsequent river flows in the summer and fall.

Fish stranding in water bodies (i.e., ponds) in the floodway but isolated from the channel at lower flows or on land has also been identified as a potential issue in the Lower American River. Typically, the potential for stranding fish would increase with the magnitude and

frequency of higher flows. However, because of the confined nature of the Lower American River, even moderate flows (e.g., 10-year events) span the full width of the levee even in the lower reaches of the river. Therefore, although there may be an increase in the magnitude and duration of higher flows under the alternatives, the potential for stranding would not be increased. Therefore, no indirect effects on splittail are expected.

Alternatives 5–7: Stepped Release Plans

Under these alternatives, peak flows in the Lower American River and the lower Sacramento River would increase as compared to the No-Action Alternative. These increased peak flows would occur infrequently during major storm events. Folsom Reservoir would be managed to the same flood storage rules as under the No-Action Alternative and the stepped release plans would not result in differences in Folsom Reservoir storage. Therefore, no changes in Lower American River summer or fall flows would occur.

There is no evidence to suggest that infrequent, short duration increases in peak flows would have any negative effect on splittail and because storage and summer and fall flows would be identical to those of the No-Action Alternative, no impacts on splittail are anticipated.

These alternatives also include expansion of the capacity of the Sacramento Weir and Bypass that allows flows into the Yolo Bypass. During peak flow events, discharges into the Yolo Bypass may be slightly increased under these alternatives. The Yolo Bypass provides good quality habitat for splittail and minor increases in the volume and flow of water through the bypass would have neutral to beneficial effects on this species.

Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

This alternative would include both dam raise and stepped release elements (Alternatives 3 and 5). No indirect effects would result.

Alternative 9: Ecosystem Restoration Alternatives

These alternatives would include floodplain or fisheries ecosystem restoration alternatives. No indirect effects would result.

INTERRELATED AND INTERDEPENDENT ACTIONS AND THEIR EFFECTS

No interrelated or interdependent actions that would affect listed or proposed species have been identified.

CUMULATIVE EFFECTS

The alternatives would not contribute to any State, local, or private actions that result in cumulative impacts.

MITIGATION AND COMPENSATION MEASURES

None required.

SECTION 7

DELTA SMELT

BACKGROUND

STATUS, DISTRIBUTION, AND LIFE HISTORY

The delta smelt was listed as a threatened species on March 5, 1993 under the Federal Endangered Species Act of 1973 (58 FR 12854). The final rule designating critical habitat for delta smelt was published on December 19, 1994 (59 FR 65255). The Service's proposed critical habitat for the delta smelt includes the Delta and Suisun Bay (59 FR 65256, December 19, 1994).

Service data indicate that delta smelt are found in the Bay-Delta estuary where salinity is generally less than 2 ppt (56 FR 50075, October 3, 1991). This species is rarely found in estuarine waters with a salinity level of greater than 10 to 12 ppt (e.g., the San Francisco Bay). Except when spawning in fresh water, delta smelt are most frequently caught in or slightly upstream from the entrapment zone where the salinity level ranges between 0.5 ppt and 5.2 ppt (Moyle et al. 1992).

Delta smelt disperse widely into fresh water in late fall and winter as the spawning period approaches, moving as far upstream as Mossdale on the San Joaquin River and the confluence of the American River with the Sacramento River. In 1989 and 1990, spawning locations ranged from Roe Island in Suisun Bay to Garcia Bend on the Sacramento River and Medford Island on the San Joaquin River (Wang 1991). During 1989, spawning in the Delta was more intensive in the San Joaquin River than in the Sacramento River and was centered around Bradford Island (Wang and Brown 1995). In addition, some spawning has been recorded in Montezuma Slough. The distribution of spawning may depend on the distribution of fresh water downstream from the Delta and the location of the salinity gradient. During high freshwater inflow to the Delta in 1993, spawning appeared to be relatively dispersed.

Delta smelt spawning occurs in fresh water from February through June and may peak during late April and early May (Wang 1991, Sweetnam and Stevens 1991, Stevens et al. 1990). Individual females probably spawn over a short period of time, but it is unclear whether individual smelt spawn more than once or whether individuals mature at different times and then spawn only once over a 4- to 5-month period (Wang 1991, Moyle et al. 1992).

The most probable spawning locations for delta smelt are dead-end sloughs and shallow edge-waters of the channels of the Delta and the Sacramento River. Ideal spawning areas are those with moderate to fast flows (including tidal action) and thriving aquatic vegetation (Wang 1991). Females deposit between 1,200 and 2,600 demersal and adhesive eggs on substrates such as rock, gravel, tree roots, and submerged vegetation (Sweetnam and Stevens 1991, Wang 1986).

After the eggs hatch (in about 12 to 14 days), larvae float to the surface and are carried by the currents (Stevens et al. 1990). Under natural outflow conditions, the larvae are carried downstream to near the entrapment zone where they typically remain and grow to adult size. When the entrapment zone is in Suisun Bay, where both shallow and deep water exist, smelt are caught most frequently in shallow water.

The proportion of the delta smelt population found in Suisun Bay during summer and fall is correlated with Delta outflow volume (Stevens et al. 1990). During summer and fall 1991, most of the smelt population was located where the concentration of total dissolved solids (TDS) was 1,300 milligrams per liter (mg/l), (i.e., at a salinity of about 1.3 ppt). Delta outflow determines the location of the salinity gradient and may strongly influence delta smelt distribution during spring, summer, and fall.

Delta smelt feed almost exclusively on zooplankton, primarily copepods (*Eurytemora affinis, Pseudodiaptomus forbesi*, and others). Sufficient data have not been collected to determine food preference. Mysids (*Neomysis mercedis*), rotifers, cladocerans, and amphipods may be important food items, depending on their availability and/or size relative to the size of delta smelt.

Juvenile smelt grow rapidly and young smelt are 40–50 mm long by early August (Stevens et al. 1990). Within 6–9 months, the young smelt reach adult lengths (59–70 mm) and grow only a few mm during the months preceding spawning.

REASONS FOR DECLINE

Abundance of year-class delta smelt is assumed to depend on the environmental conditions experienced by the eggs and young fish. This assumption is supported by high variability in annual delta smelt abundance, historical recovery from low to high abundance in short periods, poor agreement between fall and summer abundance indices, and a relatively weak spawner-recruit relationship.

With the exception of 1993, delta smelt abundance has been consistently lower during the years after 1983 than in previous years. Abundance is highly variable from year to year and the population has historically rebounded (e.g., the increase in abundance from 1992 to 1993). Introductions of exotic organisms have potentially altered the delta smelt food supply. Upstream water storage, upstream diversions, and diversions from the Delta have modified delta smelt habitat and distribution and possibly reduced abundance. The single most important factor affecting smelt abundance may be the location of X2 (2 ppt salinity or about 3,000 microsiemens electrical conductivity [EC]) in the estuary (i.e., abundance is highest when X2 is located in Suisun Bay from February to June). Environmental changes may have adverse effects on smelt survival and result in a relatively rapid reduction in abundance because delta smelt have essentially a 1-year life cycle, low fecundity, and planktonic larvae, and are confined to the estuary.

STATUS IN THE PROJECT AREA

Delta smelt occur from below the confluence of the American and Sacramento Rivers, downstream through the Delta, and into Suisun Bay (U.S. Fish and Wildlife Service 1995). Delta smelt larvae occur in the Delta primarily from February through June. Juveniles rear in the Delta through November and adults spawn from February through June. Spawning adults may occur in the Sacramento River as far upstream as the city of Sacramento. Delta smelt have also been captured in the Yolo Bypass (California Department of Water Resources 1999).

ASSESSMENT METHODS

Assessment of potential effects focuses on 1) the physical changes in habitat that could result from construction associated with levee strengthening and raising, floodwall construction, and increased Sacramento and Yolo Bypass capacity; 2) hydrological changes that could affect the extent and duration of flood plain inundation and spawning habitat during the primary delta smelt spawning period; and 3) increased flows through the Yolo Bypass during winter and spring flood periods.

PROJECT EFFECTS

DIRECT EFFECTS

Alternative 1: No Action

Under the No-Action Alternative, no construction activities would occur. Therefore, no direct effects would result.

Alternatives 2–4: Folsom Dam Raise Options

Under these alternatives, Folsom Dam and the surrounding dikes would be raised to provide additional flood storage during peak events. Construction activities would be limited to areas above Nimbus Dam and no major in-river work is anticipated. Therefore, no direct effects on delta smelt would result.

Alternatives 5–7: Stepped Release Plans

These alternatives each involve construction activities at various locations along levees within the Lower American River and the Sacramento and Yolo Bypasses. No major in-water construction activities are anticipated. Therefore, no direct effects associated with construction activity within delta smelt habitat would result. In addition, only limited construction activities would likely occur during the primary delta smelt spawning period (December–April) because of

weather and flow-related limitations for work in the floodway. Because construction activities will be largely limited to modifications to existing levees and flood control structures, no substantial loss of rearing habitat or designated critical habitat would result.

Construction activities have a slight potential to result in minor sedimentation of rearing areas and to release harmful materials (e.g., fuel) into waterways during construction. Mitigation features incorporated into the project to address this potential effect are described in Section 1.

Under Alternative 7, additional work may occur in the floodway of the Lower American River to convey up to 180,000 cfs. This work would involve raising existing bridges across the river to avoid impingement on the increased water surface elevations associated with such flows. Best management practices would be applied to all work within the floodway (see Section 1) and work would generally not occur in the river or in the floodway during periods of potentially high flows (November–April). These locations are all upstream of any areas likely to be used by delta smelt. Therefore, no effects on delta smelt are anticipated.

Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

This alternative would include both dam raise and stepped release elements (Alternatives 3 and 5). No direct effects would result.

Alternative 9: Ecosystem Restoration Alternatives

These alternatives include construction at 4 floodplain sites (Urrutia, Woodlake, Bushy lake, and Arden Bar) or on the temperature shutters on Folsom Dam. For the 4 floodplain sites, in-water construction will occur at Arden pond and the Urritta mine pit, and Bushy lake will be dewatered; however, these sites are not contiguous, and do not have inlets or outlets, to the Lower American River. The purpose of construction at these sites it to increase habitat values for native fish, wildlife, and plant species by lowering the floodplain, recreating connections to the Lower American River, and controlling invasive species. Limited work would be done in the Lower American River to connect these sites and only limited construction activities would likely occur during the primary delta smelt spawning period (December–April) because of weather and flow-related limitations on work in the floodway. Construction activities have a slight potential to result in minor sedimentation of rearing areas and to release harmful materials (e.g., fuel) into waterways during construction. Mitigation features incorporated into the project to address this potential effect are described in Section 1. These locations are all upstream of any areas likely to be used by delta smelt. Therefore, no effects on delta smelt are anticipated.

For the fisheries restoration alternative, construction would occur on Folsom Dam, above areas currently suitable for delta smelt. Therefore, no effects on splittail are anticipated.

INDIRECT EFFECTS

Alternative 1: No Action

Under the No-Action Alternative, no operational changes would result at any project locations. Therefore, no indirect effects would result.

Alternatives 2–4: Folsom Dam Raise Options

Under these alternatives, Folsom Dam and the surrounding dikes would be raised to provide additional flood storage during extreme peak events. This increased storage would be used to store peak flows that could not be safely conveyed in the Lower American River. Once the event had passed, the additional stored water would be released over a relatively short period of time and reservoir storage would be returned to the normal flood pool elevation. Most flow changes (reductions) would occur only during extreme peak events and would be of relatively short duration. In addition, there would be no net effect on the frequency or the volume of reservoir filling and subsequent river flows in the summer and fall. The location of X2 (2 ppt salinity of about 3,000 microsiemens EC) would not be affected. Therefore, no indirect effects on delta smelt are expected.

Alternatives 5–7: Stepped Release Plans

Under these alternatives, peak flows in the Lower American River and the lower Sacramento River would increase as compared to the No-Action Alternative. These increased peak flows would occur infrequently during major storm events. Folsom Reservoir would be managed to the same flood storage rules as under the No-Action Alternative and the stepped release plans would not result in differences in Folsom Reservoir storage. Therefore, no changes in Lower American River summer or fall flows would occur.

There is no evidence to suggest that infrequent, short duration increases in peak flows would have any negative effect on delta smelt. Because storage and summer and fall flows, as well as the location of X2, would be identical to those of the No-Action Alternative, no impacts on delta smelt are anticipated.

These alternatives also include expansion of the capacity of the Sacramento Weir and Bypass that allows flows into the Yolo Bypass. During peak flow events, discharges into the Yolo Bypass may be slightly increased under these alternatives. The Yolo Bypass provides good quality habitat for delta smelt and minor increases in the volume and flow of water through the bypass would have neutral to beneficial effects on delta smelt.

Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

This alternative would include both dam raise and stepped release elements (Alternatives 3 and 5). No indirect effects would result.

Alternative 9: Ecosystem Restoration Alternatives

These alternatives would include floodplain or fisheries ecosystem restoration alternatives. No indirect effects would result.

INTERRELATED AND INTERDEPENDENT ACTIONS AND THEIR EFFECTS

No interrelated or interdependent actions that would affect listed or proposed species have been identified.

CUMULATIVE EFFECTS

The alternatives would not contribute to any State, local, or private actions that result in cumulative impacts.

MITIGATION AND COMPENSATION MEASURES

None required.

SECTION 8

VALLEY ELDERBERRY LONGHORN BEETLE

BACKGROUND

STATUS, DISTRIBUTION, AND LIFE HISTORY

The valley elderberry longhorn beetle (VELB) is found only in association with its host plant, the blue elderberry (*Sambucus mexicana*) and is Federally listed as a threatened species (45 FR 52803-52807, August 8, 1980). VELB is not State listed. This species probably always has been rare and of limited abundance (U.S. Fish and Wildlife Service 1984), as a result, information on the historical distribution and abundance of VELB is scarce.

VELB's range extends from Redding at the northern end of the Central Valley, south to the Bakersfield area (Barr 1991). Along the eastern edge of the species' range, adult beetles have been found in the foothills of the Sierra Nevada at elevations of up to 2,220 feet, and beetle exit holes have been located on elderberry plants at elevations of up to 2,940 feet. Along the western edge of the species' range, adult beetles have been found on the eastern slope of the Coast Ranges at elevations of up to 500 feet, and beetle exit holes have been detected on elderberry plants at elevations of up to 730 feet (Barr 1991).

VELB is closely associated with blue elderberry, an obligate host for beetle larvae that is found within or near riparian and oak woodland habitats. VELB's life history is assumed to follow a sequence of events similar to those of related taxa: Female beetles deposit eggs in crevices in the bark of living elderberry plants. Presumably, the eggs hatch shortly after they are laid and the larvae bore into the pith of the trunk or stem. When larvae are ready to pupate, they move through the pith of the plant, open an emergence hole through the bark, and return to the pith for pupation. Adults exit through the emergence holes and can sometimes be found on elderberry foliage, flowers, or stems, or on adjacent vegetation. The entire life cycle of VELB is thought to encompass 2 years, from the time eggs are laid and hatch until adults emerge and die (U.S. Fish and Wildlife Service 1984).

The presence of exit holes in elderberry stems indicates previous VELB habitat use. Exit holes are cylindrical and approximately 0.25 inch in diameter. Exit holes can be found on stems that are 1 or more inches in diameter. The holes may be located on the stems from a few inches to about 9–10 feet above the ground (Barr 1991).

REASON FOR DECLINE

The apparent decline in VELB distribution is most likely related to the extensive loss of riparian forests in the Central Valley, which has reduced the amount of habitat available for the species and most likely decreased and fragmented the species' range (U.S. Fish and Wildlife Service 1984). Insecticide drift from cultivated fields and orchards adjacent to elderberry shrubs can potentially affect VELB populations if drift occurs at a time when adults are present on the shrubs (Barr 1991). Furthermore, herbicide drift from agricultural fields and orchards can likewise potentially affect the health of elderberry shrubs, thereby reducing the quantity and quality of VELB habitat.

STATUS IN THE PROJECT AREA

Elderberry shrubs are present throughout the project area and are likely to be affected by project construction. Surveys were conducted in the Lower American River and in portions of the Yolo Bypass as part of the 1996 Final Biological Data Report for the American River Watershed Project (U.S. Army Corps of Engineers, The Reclamation Board, Sacramento Area Flood Control Agency 1996). These surveys recorded the occurrence of 137 elderberry shrubs, and 2,123 stems greater than 1 inch in diameter, within the footprint of then-proposed project features. Approximately 35% of these shrubs had observed exit holes. These surveys also identified an additional 154 shrubs within 200 feet of project features. Numerous additional elderberry shrubs were noted but not inspected or mapped in the American River Parkway and Yolo Bypass. Although project features have changed somewhat since these surveys, the findings are considered to be indicative of the potential magnitude of effects on elderberry shrubs in these locations.

In addition, between December 2000 and February 2001, surveys for elderberry shrubs were conducted around the perimeter of Folsom Reservoir; at the Old Borrow #4, Peninsula Borrow, and Mississippi Bar borrow sites; and at the proposed bridge and road alignments downstream of Folsom Dam. For the entire survey effort, 1,121 elderberry shrubs were located. These shrubs had 2,179 stems between 1 and 3 inches in diameter, 769 stems between 3 and 5 inches in diameter, and 702 stems greater than 5 inches in diameter. Fifty exit holes were observed in the first group, 42 exit holes in the second group, and 102 holes in the third group.

More detailed information is provided below.

FOLSOM RESERVOIR

A total of approximately 450 elderberry shrubs were found along the perimeter of the lake in the footprint of the maximum reservoir pool area. Approximately 60 were found between the elevation of 474 and 478 feet MSL, 70 between 478 and 482 feet MSL, and 70 between 482 and 487 feet MSL. These shrubs would be affected only by infrequent inundation under the Folsom Dam raise alternatives, depending on the alternative selected. The remaining 250 shrubs were

either below the 474-foot elevation (approximately 140 shrubs), which would be subject to potential inundation under the No-Action Alternative, or above the 487-foot elevation (approximately 110 shrubs) and would not be subject to inundation (i.e., they would be on islands and would not be flooded).

OLD BORROW #4

Eight elderberry shrubs were observed at this site.

PENINSULA BORROW

The entire area encompassed by the five separate sites and buffer areas had a single elderberry shrub.

MISSISSIPPI BAR

A total of 184 shrubs were found at Mississippi Bar.

BRIDGE AND ROAD ALIGNMENT DOWNSTREAM FROM FOLSOM DAM

A total of 119 elderberrry shrubs were found at the bridge and road alignment downstream from Folsom Dam.

ASSESSMENT METHODS

Assessment methods to evaluate effects on VELB are primarily based on criteria established in Service's 1999 conservation guidelines for VELB (U.S. Fish and Wildlife Service 1999). Effects on VELB or VELB habitat were identified if activities associated with project construction or operation would result in direct mortality or were likely to substantially reduce local population size, lower reproductive success, or diminish habitat for VELB. Based on established guidelines, this would occur if any aspect of the project would lead to direct removal or destruction of an elderberry plant with one or more stems measuring 1.0 inch or greater in diameter at ground level or with clear signs of exit holes indicating use of the plant by VELB.

PROJECT EFFECTS

Elderberry shrubs occur throughout the project area and are likely to be affected in one or more locations. Therefore, VELB, or potential VELB habitat, may be affected by construction-

related activities in one or more locations. Operation-related activities, which include increases in flow volumes along the Lower American River and the Sacramento and Yolo Bypasses, are not expected to result in impacts on VELB or VELB habitat because this condition would not result in a substantial change from preproject conditions. Periodic and infrequent inundation of areas above the preproject inundation zone of Folsom Reservoir are not expected to adversely affect VELB or VELB habitat.

DIRECT EFFECTS

Alternative 1: No Action

Under the No-Action Alternative, construction activities in addition to those of previously authorized projects would not occur. Therefore, no direct effects on VELB would result from this alternative.

Alternative 2: Folsom Dam Raise Option

Construction activities associated with constructing a temporary construction bridge downstream of Folsom Dam could have a direct effect on approximately 21 elderberry shrubs. Construction activities specifically for raising the dam would not affect any vegetation, therefore, no elderberry shrubs would be directly affected near the dam.

Alternatives 3–4: Folsom Dam Raise Options

In addition to the elderberry shrubs located within the alignment and construction easement area for the temporary construction bridge, construction activities associated with raising Folsom Dam and the wing dams and dikes could have a direct effect on approximately 19 elderberry shrubs.These activities include the construction of project features and proposed access roads. There are 22 elderberry shrubs located at the Mississippi Bar borrow site, however, it is expected that excavation of borrow materials can be conducted without effecting any of these shrubs. As noted above, elderberry shrubs were identified and mapped around the southwestern perimeter of Folsom Reservoir, including areas near the footprint of proposed dikes and wing dam construction.

Alternatives 5–6: Stepped Release to 160,000 cfs Alternatives

Construction activities associated with implementation of the stepped release to 160,000 cfs alternative (Alternative 5) and stepped release with now Folsom Dam outlet (Alternative 6) would involve work along the landside of the Lower American River levees. Direct effects would only potentially occur to 3 elderberry shrubs. There would be no additional effects on elderberry shrubs under Alternative 6 as a result of constructing a new outlet at Folsom Dam. Recent surveys indicate that there are no elderberry shrubs within the affected areas of the Sacramento Weir or Yolo Bypass that would be directly affected. The effects could occur as a result of removal or damage to elderberry plants during construction activities.

Alternative 7: Stepped Release to 180,000 cfs

Construction activities associated with implementation of the Alternative 7 would involve additional levee work along the banks of the Lower American River and the Sacramento and Yolo Bypasses. Direct effects on approximately 150 elderberry shrubs could occur as a result of removal or damage during the construction of new levees, levee raising, levee revetment, and bridge raising along the Lower American River between Nimbus Dam and the confluence with the Sacramento River. No elderberry shrubs that would be affected in the Sacramento Weir and Yolo Bypass.

Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

Alternative 8 would involve features related to both Alternative 3 and Alternative 6. Therefore, the potential direct effects of this alternative on VELB would include all those listed under the Folsom Dam Raise Options and Stepped Release Plans.

Alternative 9: Ecosystem Restoration Alternatives

These alternatives include construction at 4 floodplain sites (Urrutia, Woodlake, Bushy lake, and Arden Bar) or on the temperature shutters on Folsom Dam. Restoration planners determined through site visits and detailed habitat mapping that no elderberry plants in the vicinity of the four floodplain sites would be affected. Because of the proximity of some elderberry plants to the restoration area at the Bushy lake site, all elderberry plants were mapped in the western half of the site; these plants would be avoided. There are no elderberry plants at the shutter site. Therefore, no direct effects on VELB would result from these alternatives.

INDIRECT EFFECTS

Alternative 1: No Action

Under the No-Action Alternative, construction activities in addition to those of previously authorized projects would not occur. Therefore, no indirect effects on VELB would result from this alternative

Alternatives 2–4: Folsom Dam Raise Options

Alternatives 2–4 evaluate operation-related effects corresponding to an increase in flood pool elevation that would result from raising Folsom Dam. An increase in flood pool elevation at Folsom Reservoir could inundate between approximately 60 and 200 near-shore elderberry plants during flood events. However, because the frequency of these flood events would be very low and the duration of inundation would be short, direct adverse effects on VELB and elderberry host plants are not anticipated.

Alternatives 5–7: Stepped Release Plans

Alternatives 5–7 evaluate operation-related effects corresponding to a stepped release of flood flows from Folsom Dam during a flood event. An increased release of floodwater could inundate near-shore elderberry plants during flood events. However, because the frequency with which flood events would require stepped release would be very low and the duration of high floodflows would occur over a very short period and because the shrubs are similarly inundated under existing conditions, direct adverse effects on VELB and elderberry host plants are not anticipated.

Alternative 8: Stepped Release to 160,000 cfs and Seven-Foot Dam Raise/482-Foot Flood Pool Elevation

Alternative 8 would involve features related to both Alternative 3 and Alternative 6. Therefore, the potential indirect effects of this alternative on VELB and VELB habitat are discussed above and are not expected to result in adverse effects on this species.

Alternative 9: Ecosystem Restoration Alternatives

These alternatives would include floodplain or fisheries ecosystem restoration alternatives and would not involve any long-term operations-related disturbances to elderberry shrubs, and there would be no change in the quantity of elderberry bushes exposed to inundation. Therefore, the alternatives are not expected to have adverse indirect effects on this species.

INTERRELATED AND INTERDEPENDENT ACTIONS AND THEIR EFFECTS

No interrelated or interdependent actions that would affect listed or proposed species have been identified.

CUMULATIVE EFFECTS

The alternatives would not contribute to any State, local, or private actions that result in cumulative impacts.

MITIGATION AND COMPENSATION MEASURES

Because of the nature and scale of anticipated adverse effects on VELB and its elderberry host plant, and the fact that significant adverse effects are likely to result only from project construction, the proposed mitigation and compensation measures are derived from the Service's 1999 conservation guidelines for VELB (U.S. Fish and Wildlife Service 1999). The mitigation measures are also based on guidance provided in the Programmatic Formal Consultation

Permitting Projects with Relatively Small Effects on Valley Elderberry Longhorn Beetle within the Jurisdiction of the Sacramento Field Office, California (U.S. Fish and Wildlife Service 1996a).

Mitigation measures to avoid, minimize, or compensate for effects on VELB are as follows:

- At such time when construction plans are finalized, a Service-approved biologist shall conduct a preconstruction survey for VELB and its elderberry host plant. The biologist will conduct a site-level survey that identifies and documents the specific locations of suitable VELB habitat within, or adjacent to, areas where construction activities will occur. Suitable VELB habitat is defined as elderberry plants with one or more stems measuring 1.0 inch or greater in diameter at ground level or those plants showing evidence of exit holes. The biologist will be responsible for submitting survey maps and immediately reporting the presence the species, if found, to the Service in order to determine appropriate actions.

If elderberry plants with one or more stems measuring 1.0 inch or greater in diameter at ground level or plants with visible evidence of exit holes are located within, or adjacent to, proposed construction areas, the Corps shall:

- Avoid disturbance to VELB by establishing and maintaining to the maximum extent feasible a 100-foot (or wider) buffer around elderberry plants identified as suitable habitat. If a 100-foot buffer cannot be maintained, the Corps shall consult and gain approval from the Service for measures that would minimize disturbance and promptly restore the damaged area.

- Fence and flag all buffer areas and place signs every 50 feet along the edge of the avoidance area displaying the following information: "This area is a habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This Species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment."

  The signs should be clearly readable from a distance of 20 feet and must be maintained for the duration of construction.

- Train construction personnel to recognize elderberry plants and to determine the presence of VELB from exit holes on stems. All construction personnel should receive Service-approved environmental awareness training prior to undertaking work at construction sites.

If avoidance and minimization of effects on VELB habitat is not possible, the Corps shall:

- Compensate for the loss and potential take by transplanting the elderberry plants that cannot be avoided to a Service-approved conservation area. Transplanting must comply

with the Service-approved transplanting procedure as defined in the 1999 conservation guidelines for VELB (U.S. Fish and Wildlife Service 1999).

- Elderberry plants that are transplanted or destroyed by construction must be replaced and protected in perpetuity, in a conservation area that is approved by the Service. The level of replacement shall range from a ratio of 1:1 to 1:8 based on location, stem diameter, and the presence or absence of exit holes. These general mitigation ratios are listed and explained in Table 8-1. Site-specific mitigation requirements may be determined by the Service based on evaluation of overall habitat value and location of habitat within the construction area. The elderberry plantings would be incorporated with the oak plantings around the reservoir.

Table 8-1: Mitigation Ratios Based on Location (Riparian vs. Nonriparian), Stem Diameter of Affected Elderberry Plants at Ground Level, and Presence or Absence of Exit Holes.

Location	Stems (maximum diameter at ground level)	Exit Holes (Y/N)	Elderberry Seedling Ratio	Associated Native Plant Ratio
Nonriparian	Stems ≥ 1 inch and < 3 inches	N	1:1	1:1
		Y	2:1	2:1
Nonriparian	Stems > 3 inches and < 5 inches	N	2:1	1:1
		Y	4:1	2:1
Nonriparian	Stems ≥ 5 inches	N	3:1	1:1
		Y	6:1	2:1
Riparian	Stems ≥ 1 inch and < 3 inches	N	2:1	1:1
		Y	4:1	2:1
Riparian	Stems > 3 inches and < 5 inches	N	3:1	1:1
		Y	6:1	2:1
Riparian	Stems ≥ 5 inches	N	4:1	1:1
		Y	8:1	2:1

Source: U.S. Fish and Wildlife Service 1999

Conduct postinundation monitoring when the flood pool elevation rises above 466 feet above MSL. This monitoring will further assess the effects of inundation on VELB and VELB habitat. The results of the monitoring will be submitted to the Service to determine appropriate actions.

SECTION 9

VERNAL POOL TADPOLE SHRIMP

BACKGROUND

STATUS, DISTRIBUTION, AND LIFE HISTORY

The vernal pool tadpole shrimp is Federally listed as an endangered species (59 FR 48136-48153, September 19, 1994). This species is not State listed. The vernal pool tadpole shrimp is found in suitable habitats in the Central Valley from Shasta County to Merced County (59 FR 48136-48153, September 16, 1994). Vernal pool tadpole shrimp are restricted to vernal wetlands (e.g., vernal pools and swales) and ephemeral stock ponds in California. This species is not known to occur in riverine or marine habitats or in other permanent bodies of water (59 FR 48136-48153, September 16, 1994).

The vernal pool tadpole shrimp occurs in vernal pool complexes and in ephemeral stock ponds. Vernal pool complexes are found in grass-bottomed swales on old alluvial soils that are underlain by hardpan or in mud-bottomed pools that contain highly turbid water (59 FR 48136-48153, September 16, 1994). The species has also been observed in stock ponds and other seasonal wetlands. Pools that are occupied by the species typically have low conductivity, TDS, and alkalinity (59 FR 48136-48153, September 16, 1994). Vernal pool tadpole shrimp often occurs with the Conservancy fairy shrimp, vernal pool fairy shrimp, and California linderiella. (Jones & Stokes file data).

The vernal pool tadpole shrimp's life history is linked to the phenological characteristics of its vernal pool habitat. When pools are dry, the species' diapaused eggs lie dormant in the dry pool sediments. After winter rainwater fills the pools, populations of the species are re-established from the diapaused eggs (Lanway 1974, Ahl 1991). Unlike the eggs of many of the fairy shrimp species, the eggs of the vernal pool tadpole shrimp do not require a freezing or drying period to hatch (Ahl 1991). Adult shrimp are often present and reproductive in vernal pools until the pools dry up in spring (Ahl, 1991; 59 FR 48136-48153, September 16, 1994). Vernal pool tadpole shrimp mature slowly and are long-lived (Ahl 1991).

REASON FOR DECLINE

The loss of vernal wetlands is the primary cause for the decline of the vernal pool tadpole shrimp. An estimated 90 percent of the suitable habitat for this species has been destroyed by human activities (e.g., commercial and residential development, agricultural development, off-road vehicle use, water development projects, and flood control projects). The alteration of vernal pool watersheds caused by modification of surrounding uplands has also resulted in a loss of suitable habitat (59 FR 48136-48153, September 16, 1994).

STATUS IN THE PROJECT AREA

There are no records of the vernal pool tadpole shrimp in or adjacent to Folsom Reservoir. The American and Sacramento Rivers are riverine habitats that are considered unsuitable for the vernal pool tadpole shrimp. The Yolo and Sacramento Bypasses are the natural floodway of the Sacramento River. River floodways are not suitable habitats for vernal species such as the vernal pool fairy shrimp and vernal pool tadpole shrimp. No vernal pools and other vernal wetlands have been observed in the Yolo Bypass (Jones & Stokes Associates 1990a, 1990b, 1998).

Vernal pool tadpole shrimp and vernal pool fairy shrimp have been observed on the west side of the Yolo Bypass in the vicinity of Interstate 80 and may occur at other locations (Jones & Stokes file data).

ASSESSMENT METHODS

For purposes of this analysis, it is assumed that any suitable habitat that is identified during the habitat assessment is occupied by vernal pool tadpole shrimp. All areas to be affected by construction adjacent to and outside of the current Yolo Bypass levee footprints will be surveyed for suitable vernal pool tadpole shrimp habitat prior to construction. However, no specific surveys were conducted for the purpose of this assessment. Effects on vernal pool tadpole shrimp were evaluated based on their potential to:

- diminish or alter existing vernal pool habitat within the project area or
- cause direct mortality, substantially reduce local population size, or lower reproductive success.

PROJECT EFFECTS

Because of the lack of suitable habitat with in the project study area, project effects on vernal pool tadpole shrimp are not expected to occur during either construction or operation

DIRECT EFFECTS

Vernal pool tadpole shrimp would not be directly affected by construction activity associated with strengthening levees along portions of the Sacramento and Yolo and Bypasses,

associated borrow and staging areas, and proposed access roads because of the lack of suitable habitat and specific construction footprint. Direct effects are also not anticipated under any of the ecosystem restoration alternatives because of lack of suitable vernal pool tadpole shrimp habitat.

INDIRECT EFFECTS

Changes in the duration, frequency, and volume of flows in the Lower American River, the Sacramento River, and the Sacramento and Yolo Bypasses that would result from operation of stepped release alternatives have the potential to affect existing populations of vernal pool tadpole shrimp in the project area. However, because the bypasses do not provide suitable, optimal habitat for vernal pool tadpole shrimp and because these effects do not represent a significant difference from preproject conditions, an adverse indirect effect on vernal pool tadpole shrimp is not expected.

INTERRELATED AND INTERDEPENDENT ACTIONS AND THEIR EFFECTS

No interrelated or interdependent actions that would affect listed or proposed species have been identified.

CUMULATIVE EFFECTS

The alternatives would not contribute to any State, local, or private actions that result in cumulative impacts.

SECTION 10

VERNAL POOL FAIRY SHRIMP

BACKGROUND

STATUS, DISTRIBUTION, AND LIFE HISTORY

The vernal pool fairy shrimp is Federally listed as a threatened species (59 FR 48136-48153, September 19, 1994). This species is not State listed. The vernal pool fairy shrimp is found at scattered locations in the Central Valley from Shasta County to Tulare County, along the Coast Ranges from Solano County to San Luis Obispo and Santa Barbara Counties, and in southern California in Riverside and San Diego Counties. This species is restricted to vernal pools and other seasonal freshwater wetlands (e.g., vernal pools and swales) in California. Vernal pool fairy shrimp are not known to occur in riverine or marine habitats or in other permanent bodies of water (59 FR 48136-48153, September 16, 1994).

The vernal pool fairy shrimp inhabits vernal pools with clear to tea-colored water. Occupied pools are usually in grass-bottomed or mud-bottomed swales or basalt flow depressions within unplowed grasslands (59 FR 48136-48153, September 16, 1994). The species is distributed sporadically within vernal pool complexes. Pools that are occupied by the species typically have low conductivity, TDS, alkalinity, and chloride (Collie and Lathrop 1976). The vernal pool fairy shrimp often occurs with vernal pool tadpole shrimp and California linderiella. When found with other shrimp species, however, the vernal pool fairy shrimp is never the most abundant species (Eng et al. 1990). The vernal pool fairy shrimp has been observed in vernal pools from December to early May. This species can mature quickly and, therefore, is able to persist in short-lived shallow pools (59 FR 48136-48153, September 16, 1994).

REASON FOR DECLINE

The loss of vernal wetlands is the primary cause for the decline of the vernal pool fairy shrimp. An estimated 90 percent of the suitable habitat for this species has been destroyed by human activities (e.g., commercial and residential development, agricultural development, off-road vehicle use, water development projects, and flood control projects). The alteration of vernal pool watersheds caused by modification of surrounding uplands has also resulted in a loss of suitable habitat (59 FR 48136-48153, September 16, 1994).

STATUS IN THE PROJECT AREA

There is one record (1996) of vernal pool fairy shrimp within the American River Parkway (California Natural Diversity Database 2000). There are no other records of vernal pool

fairy shrimp along the American and Sacramento Rivers. Riverine habitats are considered unsuitable for vernal pool fairy shrimp. The Yolo Bypass is the natural floodway of the Sacramento River. River floodways are not suitable habitats for vernal species such as the vernal pool fairy shrimp and vernal pool tadpole shrimp. No vernal pools or other vernal wetlands have been observed in the Yolo Bypass (Jones & Stokes Associates 1990a, 1990b, 1998).

ASSESSMENT METHODS

For purposes of this analysis, it is assumed that any suitable habitat that is identified during the habitat assessment is occupied by vernal pool fairy shrimp. All areas to be affected by construction adjacent to and outside of the current Yolo Bypass levee footprints will be surveyed for suitable vernal pool fairy shrimp habitat prior to construction. However, no specific surveys were conducted for the purpose of this assessment. Effects on vernal pool fairy shrimp were evaluated based on the potential of project-related activities to:

- diminish or alter existing vernal pool habitat in the project area or
- cause direct mortality, substantially reduce local population size, or lower reproductive success.

Although no suitable habitat exists in the Yolo Bypass, some potential habitat may occur in areas outside of levees that are proposed for levee relocation or levee modification. Vernal pool fairy shrimp have been observed on the west side of the Yolo Bypass in the vicinity of Interstate 80 and may occur at other locations within or near the project area. (Jones & Stokes file data).

PROJECT IMPACTS

Because of the lack of suitable habitat within the project study area, project effects on vernal pool fairy shrimp are not expected during either construction or operation.

DIRECT EFFECTS

Vernal pool fairy shrimp would not be directly affected by construction activity associated with strengthening levees along portions of the Sacramento and Yolo Bypasses, associated borrow and staging areas, and proposed access roads because of the lack of suitable habitat and specific construction footprint. Direct effects are also not anticipated under any of the ecosystem restoration alternatives because of lack of suitable vernal pool fairy shrimp habitat.

INDIRECT EFFECTS

Changes in the duration, frequency, and volume of flows in the Lower American River, the Sacramento River, and the Sacramento and Yolo Bypasses that would result from operation of any of the stepped release alternatives have the potential to affect existing populations of vernal pool fairy shrimp in the project area. However, because the bypasses do not provide suitable, optimal habitat for vernal pool fairy shrimp and because these effects do not represent a significant difference from preproject conditions, an adverse indirect effect on vernal pool fairy shrimp is not expected.

INTERRELATED AND INTERDEPENDENT ACTIONS AND THEIR EFFECTS

No interrelated or interdependent actions that would affect listed or proposed species have been identified.

CUMULATIVE EFFECTS

The alternatives would not contribute to any State, local, or private actions that result in cumulative impacts.

SECTION 11

GIANT GARTER SNAKE

BACKGROUND

STATUS, DISTRIBUTION, AND LIFE HISTORY

The giant garter snake is a Federally and State-listed threatened species (58 FR 54053-54065, October 20, 1993). Historically, this species was found throughout the Central Valley from Butte County south to Kern County. The giant garter snake had been extirpated from the southern one-third of its range by the 1940s to 1950s as a result of habitat loss to wetland reclamation and agricultural development (Hansen and Brode 1980). As recently as the 1970s, the species' range extended from the vicinity of Chico in Butte County (Rossman and Stewart 1987) south to near Burrell in Fresno County (Hansen and Brode 1980). Presently, giant garter snake populations are limited to ponds, sloughs, marshes, and rice fields in Sacramento, Sutter, Butte, Colusa, and Glenn Counties. Additional remnant populations of giant garter snake exist along the western border of the Yolo Bypass in Yolo County, along the eastern fringes of the Delta from the Laguna Creek-Elk Grove region of Sacramento County to Stockton in San Joaquin County, and south to Fresno County (Hansen 1988; 58 FR 54053-54065, October 20, 1993).

The Service recognizes 13 populations of giant garter snake. The locations of these populations coincide with historical riverine flood basins and tributary streams throughout the Central Valley. Some of these populations may not be viable because they are small and occur in areas where the quality and extent of habitat are limited. Populations in the Butte, Colusa, Sutter, and American Basins occupy the agricultural water delivery and drainage ditches associated with rice production. Populations in other areas occur in small, isolated patches of habitat. The largest extant population of giant garter snakes inhabits the agricultural channels and ditches in the American Basin at the confluence of the American and Sacramento Rivers (58 FR 54053-54065, October 20, 1993). Giant garter snake populations are believed to be declining (California Department of Fish and Game 1994).

The giant garter snake is endemic to Central Valley wetlands. The species inhabits marshes; sloughs; ponds; small lakes; and low-gradient waterways such as small streams, irrigation and drainage canals, and rice fields. Giant garter snakes feed on small fish, tadpoles, and frogs (Fitch 1940, Hansen 1988). The giant garter snake requires the following habitat components:

- Adequate water during the active season (early spring through mid-fall) to provide food and cover;

- Emergent wetland vegetation such as cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.) to provide escape cover and foraging habitat;

- Grassy banks for basking; and

- Higher elevation uplands for cover and refuge from winter floods during the dormant season (i.e., November to mid-March) (Hansen and Brode, 1980; Hansen, 1988; 58 FR 54053-54065, October 20, 1993).

Giant garter snakes are absent from large rivers and other water bodies that support introduced populations of large, predatory fish; wetlands with sand, gravel, and rock substrates; and natural and artificial waterways where weeds are controlled routinely, either mechanically or chemically, and where bank soils are compacted regularly (Hansen and Brode 1980; Rossman and Stewart 1987; Hansen 1988). Giant garter snakes are usually also absent from riparian woodlands because the woodlands have excessive shade and lack basking areas and prey populations (Hansen and Brode 1980).

The wetland habitats where giant garter snakes are known to occur contain permanent or seasonal water, mud bottoms, and vegetated dirt banks (Fitch 1940, Hansen and Brode 1980). In portions of the species' range where rice is grown, this species has adapted well to the vegetated artificial waterways used to flood rice fields (Hansen and Brode 1980). Prior to wetland reclamation, occupied habitats probably consisted of freshwater marshes and low-gradient streams.

REASON FOR DECLINE

Giant garter snake populations have declined primarily from habitat fragmentation and loss to agricultural uses, urban development, and flood control projects (Hansen and Brode 1980). Remaining valley wetland habitats continue to be degraded by toxic chemicals associated with agricultural, industrial, and urban runoff.

Predation may also be an important factor in the giant garter snake's decline. Predatory fish that have been introduced throughout the Central Valley compete with and prey on giant garter snakes. The introduction of non-native predatory fish species has reduced the suitability of nearly all permanent and semipermanent waters in the Central Valley (58 FR 54053-54065, October 20, 1993). The bullfrog may also be an important predator on giant garter snakes. The bullfrog has also been introduced throughout the Central Valley and is known to prey on garter snakes (Treanor 1983).

STATUS IN THE PROJECT AREA

Giant garter snakes occur in the drainage canals in the American Basin, which is north of the American River and west of the Natomas East Main Drain (Hansen and Brode 1980). West of the Yolo Bypass in Yolo County, giant garter snakes have been observed in the Willow Slough Bypass and near the Yolo County Landfill (California Natural Diversity Database 2000,

Jones & Stokes Associates 1990a). Because giant garter snakes do not occur in large rivers, the American and Sacramento Rivers are considered unsuitable habitats.

DFG indicated that major floodways, such as the Yolo and Sutter Bypasses, are not considered viable, long-term giant garter snake habitat because the frequency of inundation is once every 3-5 years, which would drown hibernating snakes (California Department of Fish and Game 1991). A survey conducted in 1990 on the Conaway Ranch found only one giant garter snake in the Yolo Bypass and three west of the Bypass (Jones & Stokes Associates 1990a).

Giant garter snakes may be present in low numbers in suitable habitat in the Sacramento and Yolo Bypass areas, although habitat in the Yolo Bypass is of low quality because of frequent flooding, disturbance from rice and crop management practices, and the absence of stable ditch vegetation (Jones & Stokes Associates 1990a, 1994, 1998). Giant garter snakes could use the levees along the Sacramento and Yolo Bypasses for hibernation sites, but there are no data available to support giant garter snake use of the levees.

ASSESSMENT METHODS

For purposes of this analysis, it is assumed that any suitable habitat that is identified during the habitat assessment is occupied by giant garter snake. All areas to be affected by construction adjacent to and outside of the current levee footprints would be surveyed for suitable giant garter snake habitat prior to construction. However, no site-specific surveys were conducted for the purpose of this assessment. Effects on giant garter snake were evaluated based on their potential to:

- Diminish or alter existing giant garter snake habitat within the project area, or
- Cause direct mortality, substantially reduce local population size, or lower reproductive success of the species.

PROJECT EFFECTS

Because of the lack of suitable habitat within the project study area, project effects on giant garter snake are expected to be limited to construction- and operation-related activities in and adjacent to the Sacramento and Yolo Bypasses. Therefore, project effects would result from implementation of only the stepped release alternatives. Because giant garter snake is a Federally listed and State-listed threatened species, effects were considered significant if they would have the potential to substantially disrupt, diminish, or reduce populations or habitat for this species.

DIRECT EFFECTS

Giant garter snakes may be directly affected by construction activity associated with the modification of the levees and associated borrow areas, staging areas, and access roads within or adjacent to the Natoma East Main Drain area and the Sacramento and Yolo Bypasses. Construction activity may potentially damage or destroy occupied upland burrows. Because giant garter snakes could use affected portions of the Lower American River levee area as upland burrows during winter months, direct harm or disruption of habitat could occur.

INDIRECT EFFECTS

Changes in the duration, frequency, and volume of flows in the Lower American River, the Sacramento River, and the Sacramento and Yolo Bypasses that would result from operation of stepped release alternatives have the potential to affect giant garter snakes within the project area. However, because the bypasses do not provide suitable, optimal habitat for giant garter snakes and because these effects do not represent a significant difference from preproject conditions, an adverse indirect effect on giant garter snakes is not expected.

INTERRELATED AND INTERDEPENDENT ACTIONS AND THEIR EFFECTS

No interrelated or interdependent actions that would affect listed or proposed species have been identified.

CUMULATIVE EFFECTS

The alternatives would not contribute to any State, local, or private actions that result in cumulative impacts.

MITIGATION AND COMPENSATION MEASURES

Because of the nature and scale of anticipated adverse effects on giant garter snakes and their habitat, mitigation and compensation measures are derived primarily from the Service's Standard Avoidance and Minimization Measures during Construction Activities in Giant Garter Snake Habitat. Mitigation measures also are based on the guidance provided in the Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California. (U.S. Fish and Wildlife Service 1997)

Mitigation measures to avoid, minimize, and compensate for effects on the giant garter snake are as follows:

- At such time when construction plans are finalized, a Service-approved biologist shall conduct a preconstruction survey for giant garter snake and its habitat at each site where construction activities will occur. This survey will identify and document the specific locations of suitable habitat within, or adjacent to, proposed construction areas. The biologist will be responsible for submitting survey maps and immediately reporting the presence of the species, if found, to the Service in order to determine appropriate actions.

If giant garter snake habitat is identified during the preconstruction survey identified above, the Corps shall:

- Avoid construction activities within 200 feet from the banks of giant garter snake aquatic habitat and confine movement of heavy equipment to existing roadways to minimize habitat disturbance to the maximum extent feasible.

- Time construction activities within habitat so that they occur between May 1 and October 1. This is the active period for giant garter snakes and direct mortality is lessened, because snakes are expected to actively move and avoid danger. The Corps shall contact the service prior to undertaking construction activities within habitat between October 2 and April 30 to determine if additional measures are necessary to minimize and avoid take.

- Inform construction personnel to recognize giant garter snakes and their habitat(s). Construction personnel should receive Service-approved worker environmental awareness training prior to undertaking work at construction sites.

- Survey the project area for giant garter snakes 24 hours prior to initiating construction activities. After construction has been initiated, a Service-approved biologist shall be available thereafter. If a snake is encountered during construction, the biologist shall have the authority to stop all construction activity until appropriate corrective measures can be completed or it has been determined that the snake will not be harmed. A survey of the project area should be repeated if a lapse in construction activity of 2 weeks or greater has occurred. Sightings and acknowledgement of incidental take shall be reported to the Service immediately.

- Confine clearing to the minimum area necessary to facilitate construction activities. Flag and designate avoided giant garter snake habitat within or adjacent to the project area as an environmentally sensitive area. This area should be avoided by all construction personnel.

- Ensure any dewatered habitat remains dry for at least 15 consecutive days after April 15 and prior to excavating or filling the dewatered habitat.

- Remove temporary fill and construction debris and, wherever feasible, restore disturbed areas to preproject conditions after construction activities. Restoration work may include such activities such as replanting species removed from banks or replanting emergent vegetation in the active channel.

If avoidance and minimization of giant garter snake habitat is not possible, the Corps shall:

- Compensate loss and disturbance of giant garter snake habitat at a ratio of 3:1 or, if restoration is undertaken after construction, at a 2:1 level of replacement. Giant garter snake habitat includes 2 acres of surrounding upland habitat for every 1 acre of aquatic habitat. The 2 acres of upland habitat also may be identified as 218 linear feet of bankside habitat that incorporates adjacent uplands to a width of 200 feet from the edge of the bank. Each acre of created aquatic habitat should be supported by 2 acres of surrounding habitat. Compensation may include creating upland refuges and hibernacula for the giant garter snake that are above the 100-year flood plain.

Wetland and upland acres provided for the giant garter snake shall be protected in perpetuity in a Service-approved conservation easement or similarly protective covenants in the deed.

SECTION 12

CALIFORNIA RED-LEGGED FROG

BACKGROUND

STATUS, DISTRIBUTION, AND LIFE HISTORY

The California red-legged frog is Federally listed as threatened and is a State species of special concern (61 FR 101:25813-25833, May 23, 1996). Critical habitat was designated for the California red-legged frog on March 13, 2001, in portions of 28 counties in California (66 FR 49:14625-14674, March 13, 2001). No designated critical habitat is located within the project area. Only three known populations of California red-legged frog exist in the Sierra Nevada, none of which are in the project area (66 FR 49:14625-14674, March 13, 2001).

Historically, the California red-legged frog was found in scattered populations throughout much of lowland California west of the Sierra Nevada (Stebbins 1972). It is typically found from sea level to elevations of approximately 1,500 meters (5,000 feet). The species' historical range extended from Point Reyes in coastal Marin County inland to Redding in Shasta County and south to northwestern Baja California, Mexico. The species has been extirpated from approximately 70 percent of its historical range (66 FR 49:14625-14674, March 13, 2001), including the floor of the Central Valley and probably more than half of the drainage systems in the Central Valley (Hayes and Jennings 1986).

The California red-legged frog is considered threatened in the central Sierra Nevada, has been extirpated from the southern Sierra Nevada and Central Valley, and is declining in the Coast Ranges (Stebbins 1985, Hayes and Jennings 1986). Only three localities in the Sierra Nevada are known to support large breeding populations of the California red-legged frog (66 FR 49:14625-14674, March 13, 2001). Remaining populations are threatened by the continued loss of wetland habitat and the introduction of non-native predatory species.

California red-legged frogs are usually found near ponds, creeks, marshes, and other vegetated wetlands but may disperse far from water following breeding (Stebbins 1985, Zeiner et al. 1988). Adult red-legged frogs are highly aquatic when active but are less dependent on permanent water bodies than are other frog species (Brode and Bury 1984). During dry periods, adults may estivate in rodent holes or cracks in the soil.

California red-legged frogs require permanent or nearly permanent ponded water habitat (including stock ponds and pools within streams) with emergent and submergent vegetation (Storer 1925, Stebbins 1972). The highest densities of California red-legged frogs occur in deep-water ponds (i.e., at least 3 feet deep) with dense stands of overhanging willows and fringes of cattails (Hayes and Jennings 1988, Jennings 1988, 59 FR 4888-4895, February 2, 1994). Red-legged frogs occur most frequently in intermittent waters that lack bullfrogs and introduced fish species (Hayes and Jennings 1988).

California red-legged frogs lay their eggs from December to early April. The egg clusters are deposited around aquatic vegetation. Red-legged frog larvae require about 3–5 months to complete metamorphosis (Storer 1925).

The diet of the California red-legged frog is highly variable. Invertebrates have been reported as the most common food item. However, Hayes and Tennant (1985) noted that larger frogs consumed a significant amount of vertebrate prey, including Pacific tree frogs (*Hyla regilla*) and deer mice.

REASON FOR DECLINE

California red-legged frog populations have declined primarily from habitat loss, overharvest, and the introduction of bullfrogs and various game fish species (Moyle 1973, Stebbins 1985, Hayes and Jennings 1988). Certain areas, such as the San Joaquin Valley, were particularly affected by wetland reclamation and species harvest (Jennings and Hayes 1984).

The introduction of the bullfrog has resulted in the extirpation of many red-legged frog populations throughout the species' range (66 FR 49:14625-14674, March 13, 2001) and is considered the most important factor in the elimination of California red-legged frogs from the floor of the Central Valley (Moyle 1973). The bullfrog preys on the smaller red-legged frog and is the more successful food-competitor. Although the number of permanent ponds in the Central Valley below 4,500 feet elevation has increased, most red-legged frog populations are found in intermittent waters. Hayes and Jennings (1988) suggested that red-legged frog populations may be uncommon in these permanent ponds because of the presence of bullfrogs and non-native fishes.

STATUS IN THE PROJECT AREA

The California red-legged frog has been extirpated from the Sacramento Valley (i.e., west of Auburn) (Jennings and Hayes 1984); therefore, the red-legged frog is not expected to occur in the American River west of Auburn, the Sacramento River, or the Yolo and Sacramento Bypasses. In addition, California red-legged frog is not expected to occur in or around Folsom Lake.

ASSESSMENT METHODS

Assessment of potential effects on the California red-legged frog is based on the locations of known and likely frog populations and habitat and the possibility of direct and indirect effects on those populations and habitat from project-related activities.

PROJECT EFFECTS

The California red-legged does not occur in any areas affected either directly or indirectly by the project. Therefore, no effects would result.

INTERRELATED AND INTERDEPENDENT ACTIONS AND THEIR EFFECTS

No interrelated and interdependent actions have been identified that would affect the California red-legged frog.

CUMULATIVE EFFECTS

The project would not result in any contribution to cumulative effects on the California red-legged frog.

MITIGATION AND COMPENSATION MEASURES

None required.

SECTION 13

SWAINSON'S HAWK

BACKGROUND

STATUS, DISTRIBUTION, AND LIFE HISTORY

The Swainson's hawk is State listed as a threatened species. This species is not Federally listed. The Swainson's hawk occurs in California only during the breeding season (March through September) and winters in South America. Historically, the Swainson's hawk's breeding range in California included the Great Basin and the Sacramento and San Joaquin Valleys; it is also known to nest along the coast in central and southern California and, in isolated occurrences, in the Colorado and Mojave Deserts (Bloom 1980). Today, Swainson's hawks nest in some of the previously occupied regions of the state, but the number of breeding birds has been greatly reduced throughout major portions of the species' range (California Department of Fish and Game 1994). Swainson's hawks have been extirpated in coastal and central California. Although most Swainson's hawks migrate to South America, the species has wintered in the Delta annually since 1991 (Yee et al. 1991, Herzog 1996).

Swainson's hawks forage in large, open plains and grassland ecosystems. The widespread conversion of native grasslands to agricultural uses has reduced Swainson's hawk foraging habitat in the Central Valley primarily to intensively farmed agricultural fields and pasturelands (Estep 1989). Hay, grain, and most row crops provide suitable Swainson's hawk foraging habitat during at least part of the breeding season. Swainson's hawks eat primarily small rodents and insects (Estep 1989).

Swainson's hawks usually nest in large, mature trees. Native trees are almost always used, although nests have been found in non-native eucalyptus (*Eucalyptus* sp.) trees and ornamental conifers. Although nest sites are not found exclusively in riparian habitat, more than 87 percent of the known nest sites in the Central Valley are within riparian systems (Schlorff and Bloom 1984, Estep 1984). This is primarily a function of tree availability and not a preference for large riparian stands or the presence of other components of a riparian forest. Swainson's hawks also nest in mature roadside trees, isolated individual trees in agricultural fields, small groves of oaks, and trees around farm houses (California Department of Fish and Game 1994).

REASON FOR DECLINE

Conversion of native grassland and woodland communities to agricultural uses is believed to be the primary cause for the decline of the Swainson's hawk. Pesticide contamination, mortality during migration or on the South American wintering grounds, poisoning by toxic chemicals including pesticides on the South American wintering grounds, disturbance on the breeding grounds, and competition with other raptors may have also

contributed to the species' decline. Remaining populations of Swainson's hawks in California have shifted into areas that continue to provide suitable nesting habitat and suitable agricultural foraging habitats (e.g., alfalfa and other hay crops) in close proximity.

STATUS IN THE PROJECT AREA

Swainson's hawk nests are known to occur along the Sacramento River and portions of the Yolo Bypass (California Natural Diversity Database 2000). There are records of nesting along the Lower American River near the confluence with the Sacramento River (Jones & Stokes file data). This species does not occur elsewhere along the Upper or Lower American River.

A CNDDB record from 1991 lists an active Swainson's hawk within 0.5 miles of the Sacramento Bypass and Yolo Bypass intersection. There are at least 20 additional CNDDB records for Swainson's hawks within 10 miles of the Sacramento Bypass and Yolo Bypass intersection. Most of these nests were recorded as being active between 1990 and 1993. One of these nests was also active in 2000 (Jones & Stokes file data).

ASSESSMENT METHODS

Effects on Swainson's hawk were evaluated based on the potential for construction- or operation- related activities to:

- Substantially alter or disturb nesting sites;
- Substantially remove or disturb annual grasslands used for foraging areas; or
- Cause direct mortality, substantially reduce local population size, or lower reproductive success of Swainson's hawk existing in the project area.

PROJECT EFFECTS

Because of this species' limited presence within the project study area, project effects on Swainson's hawk are expected to be limited to construction-related activities in and adjacent to the Sacramento and Yolo Bypasses. Therefore, project effects would result from implementation of only the stepped release alternatives. Because Swainson's hawk is a State-listed threatened species, effects were considered significant if they would have the potential to substantially disrupt, diminish, or reduce populations or habitat for this species.

DIRECT EFFECTS

Swainson's hawk may be directly affected by construction-related activities. Construction activity could destroy active Swainson's hawk nests or could disturb nesting pairs, which would lead to the destruction of eggs or the death of young. In addition, direct impacts could result from the temporary loss or disturbance of foraging area. This disturbance is most likely to occur in or around areas associated with raising, relocating, and constructing new levees, restoring habitat, and within corresponding borrow sites and access roads along the Lower American River and the Sacramento and Yolo Bypasses, primarily near the confluence with the Sacramento River.

INDIRECT EFFECTS

No indirect effects were identified for the Swainson's hawk. Changes in the duration, frequency, and volume of flows in the Lower American River, the Sacramento River, and the Sacramento and Yolo Bypasses do not represent a significant difference from preproject conditions. Because Swainson's hawks do not winter in the project area when these conditions typically occur, changes in the duration, frequency, and volume of flow are not expected to adversely effect the species.

INTERRELATED AND INTERDEPENDENT ACTIONS AND THEIR EFFECTS

No interrelated or interdependent actions that would affect listed or proposed species have been identified.

CUMULATIVE EFFECTS

The alternatives would not contribute to any State, local, or private actions that result in cumulative impacts.

MITIGATION AND COMPENSATION MEASURES

The Corps shall implement the following mitigation measures to avoid, minimize, and compensate for disturbance of Swainson's hawks as a result of construction-related activities:

- At such time when construction plans are finalized, a Service-approved biologist shall conduct a preconstruction survey for Swainson's hawks at each site where construction activities will occur. This survey will identify and document the specific locations of nest sites within 0.5 mile and previously documented sites within 10 miles of proposed construction areas. The biologist will be responsible for submitting survey maps and

immediately reporting the presence the species, if found, to DFG in order to determine appropriate actions.

If Swainson's hawks are found to be nesting within 0.5 mile of an area where construction activity will occur, or a nest is located after construction is initiated, the Corps shall:

- Monitor and evaluate disturbance of the nesting pair during construction based on the level of ongoing disturbance (e.g., farming activities or road traffic) and the observed sensitivity of the birds to ongoing activities. This evaluation will be in consultation with, and performed by a DFG-approved biologist with Swainson's hawk or other raptor experience.

Based on the recommendations of the monitoring biologist and DFG, the Corps shall offset potential disturbance through implementation of one or more of the following measures:

- Avoid removal of potential nesting trees and monitor nest sites.

- Establish and maintain an appropriate buffer for construction activities. This buffer can be adjusted, based on changes in sensitivity exhibited by the hawks over the course of the nesting season.

- Defer construction in the vicinity of an active nest until after August 15 if nesting pairs are located and would be affected by construction activities.

If construction activity will remove or disturb annual grassland within 10 miles of a previously documented active nest tree, additional consultation with DFG will be necessary regarding mitigation and management conditions for the loss of Swainson's hawk foraging habitat (California Department of Fish and Game 1994).

SECTION 14

BANK SWALLOW

BACKGROUND

STATUS, DISTRIBUTION, AND LIFE HISTORY

The bank swallow is State listed as threatened. This species is not Federally listed. Bank swallows are migrants that breed in California and spend winters in South America. In California, the bank swallow breeds primarily in the Central Valley along the upper Sacramento River where the river meanders in a mostly natural state. The bank swallow requires primarily bluffs or banks with soft sand and sandy loam soil immediately adjacent to still or running water. The species constructs burrows 2–3 feet deep into the nearly vertical eroding banks. The bank swallow breeds and lays a clutch of 4–5 eggs in April; the young hatch in May and 2–3 young are fledged by July. Bank swallows make one breeding attempt each year. The adults and young of the year remain along the riverbanks until they migrate in fall.

The bank swallow historically occurred along the larger lowland rivers throughout California, with the exception of southern California, where the species occurred principally along the coast and at the mouths of large rivers (Laymon et al. 1988, Garrison and Humphrey 1986). This species has now been extirpated from southern California and its range has been reduced by 50 percent since 1900 (Laymon et. al.1988, California Department of Fish and Game 1997). It is currently confined to the Sacramento River above the town of Colusa and is scattered in colonies throughout northern California. The bank swallow is found along several rivers in the lower Sacramento River Valley, including the Sacramento River, Feather River, Cache Creek, Cosumnes River, and American River (Humphrey and Garrison 1986, Laymon et al. 1988, California Natural Diversity Database 1995). Bank swallows historically nested along the Lower American River. The most recently recorded nesting activity along the Lower American River occurred in the late 1980s (California Natural Diversity Database 2000).

During a survey conducted in 1987, a total of 111 colonies were located statewide (Laymon et al. 1988). Seventy-five percent of the state's bank swallow population is concentrated on the banks of Central Valley rivers, including about 50–60 colonies along the Sacramento River (California Department of Fish and Game 1994). No bank swallow colonies have been found along the Sacramento River downstream from the confluence with the Feather River (California Natural Diversity Database 1995).

REASON FOR DECLINE

The bank swallow has been eliminated from southern California primarily because most rivers and natural waterways historically used by bank swallows have been converted into flood control channels. Elsewhere in California, riprapping of natural riverbanks and flood control

projects have been the major causes for the decline of this species (California Department of Fish and Game 1997).

STATUS IN THE PROJECT AREA

Bank swallows historically nested along the Lower American River; however, the most recent recorded nesting activity along the Lower American River occurred in the late 1980s (California Natural Diversity Database 2000). The bank swallow is currently confined to the Sacramento River above the town of Colusa and is scattered in colonies in northern California, all of which are outside of the project area (California Natural Diversity Database 2000). There are no bank swallow nesting records of bank swallow colonies in the Yolo and Sacramento Bypasses.

ASSESSMENT METHODS

Effects on bank swallows were evaluated based on the potential for construction- or operation- related activities to:

- Substantially alter or disturb nesting sites;
- Substantially remove or disturb foraging areas used by the bank swallow; or
- Cause direct mortality, substantially reduce local population size, or lower reproductive success of bank swallows existing in the project area.

PROJECT EFFECTS

DIRECT EFFECTS

Nesting bank swallows could be directly affected by construction-related activities associated with levee raising and levee revetment, and floodplain ecosystem restoration, along the Lower American River between Nimbus Dam and the confluence with the Sacramento River if nests occur within or close to construction sites. It is unlikely that suitable habitat exists in other portions of the project area along the Sacramento River or in the Sacramento and Yolo Bypasses.

INDIRECT EFFECTS

No indirect effects were identified for the bank swallows. Changes in the duration, frequency, and volume of flows in the Lower American River, the Sacramento River, and the Sacramento and Yolo Bypasses do not represent a significant difference from preproject conditions. Because bank swallows do not winter in the project area when these conditions typically occur, changes in the duration, frequency, and volume of flows are not expected to adversely affect bank swallows.

INTERRELATED AND INTERDEPENDENT ACTIONS AND THEIR EFFECTS

No interrelated or interdependent actions that would affect listed or proposed species have been identified.

CUMULATIVE EFFECTS

The alternatives would not contribute to any State, local, or private actions that result in cumulative impacts.

MITIGATION AND COMPENSATION MEASURES

Mitigation measures to avoid, minimize, and compensate for effects on bank swallows are the following:

- At such time when construction plans are finalized, a DFG-approved biologist shall conduct a preconstruction survey for bank swallows and their habitat at each site where construction activities will occur and where there is potential habitat. This survey will identify and document the specific locations of suitable habitat within, or adjacent to, proposed construction areas. The biologist will be responsible for submitting survey maps and immediately reporting the presence of the species, if found, to DFG in order to determine appropriate actions.

If bank swallow colonies are located adjacent to proposed construction areas, the Corps shall:

- Monitor the existing bank swallow colonies at a regular interval during construction to determine if the construction activity is affecting nesting success. This monitoring should be performed by a DFG-approved biologist. This biologist will report monitoring results directly to DFG in order to determine additional mitigation requirements if necessary.

If bank swallow colonies are located within proposed construction areas and cannot be avoided, construction at that location shall be deferred until after August 1.

SECTION 15

SPECIES NOT LIKELY TO BE AFFECTED BY THE PROJECT

This section provides a summary of Federally listed and State-listed species in addition to those species that were identified in the Service's list and the CNDDB search, but that are not likely to occur in any areas that will be affected by the project. This section briefly summarizes the status and distribution of each species and gives reasons why these species were not analyzed in more detail.

DELTA GREEN GROUND BEETLE

The Delta green ground beetle is Federally listed as threatened. This species is not State listed. The Delta green ground beetle does not occur in the project area and therefore will not be affected. The two known population sites for this species are in Solano County, approximately 8 miles south of Dixon (45 FR 52809, August 8, 1980).

SAN JOAQUIN VALLEY RIPARIAN WOODRAT

The San Joaquin Valley riparian woodrat is Federally listed as endangered and is State-listed as a species of special concern. This species does not occur in the project area and therefore will not be affected. The San Joaquin Valley riparian woodrat is known only to occur in Stanislaus and San Joaquin Counties along the San Joaquin, Stanislaus, and Tuolumne Rivers, as well as at Caswell State Park in San Joaquin County near the confluence of the Stanislaus and San Joaquin Rivers.

RIPARIAN BRUSH RABBIT

The riparian brush rabbit is Federally listed as endangered and is State listed as a species of special concern. This species does not occur in the project area and therefore will not be affected. The riparian brush rabbit is limited to Caswell State Park in San Joaquin County.

LAYNE'S RAGWORT

Layne's ragwort is Federally listed as threatened and is State listed as rare. This species does not occur in the project area and therefore will not be affected. The species is found only in

El Dorado County and in the Red Hills of Tuolumne County, at 38 localities ranging in elevation from 680 to 2,900 feet.

EL DORADO BEDSTRAW

El Dorado bedstraw is Federally listed as endangered and is State listed as rare. This species does not occur in the project area and therefore will not be affected. The species is found only in El Dorado County, at eight localities ranging in elevation from 440 to 1,920 feet. Most of the known populations of El Dorado bedstraw occur on the south side of the South Fork of the American River canyon, between Folsom Reservoir and Pine Hill.

PALMATE-BRACTED BIRD'S BEAK

Palmate-bracted bird's beak is Federally and State listed as endangered. This species does not occur in the project area and therefore will not be affected. The nearest known locality is near Woodland, more than 10 miles northwest of the confluence of the American and Sacramento Rivers.

Palmate-bracted bird's beak is an annual herb endemic to moist lowlands in the Central Valley and the Livermore Valley and is restricted to saline-alkali soils in relatively undisturbed, seasonally flooded, alkali sink scrub habitats. Today it occurs at Delevan National Wildlife Refuge, at Colusa National Wildlife Refuge, near the city of Woodland, in the Springtown wetlands north of Livermore, and at DFG's Alkali Sink Ecological Reserve in Fresno County.

ANTIOCH DUNES EVENING PRIMROSE

Antioch Dunes evening primrose is Federally and State listed as endangered. This species does not occur in the project area and therefore will not be affected. The nearest known locality is on Brannan Island in the Delta. Antioch Dunes evening primrose is a perennial herb endemic to the Antioch Dunes, south of the confluence of the Sacramento and San Joaquin Rivers. Its historical distribution was not much more extensive than its present distribution in 70 acres of remnant dunes at Antioch.

CRAMPTON'S TUCTORIA

Crampton's tuctoria is Federally and State listed as endangered. This species does not occur in the project area and therefore will not be affected. This species is only known south of Dixon in Solano County (Stone et al. 1988, California Natural Diversity Database 2000).

STEBBINS' MORNING-GLORY

Stebbins' morning-glory is Federally and State listed as endangered. This species does not occur in the project area. The species is known from fewer than 15 occurrences in El Dorado County south of the South Fork of the American River, and Nevada County north of the North Fork of the American River. Stebbins' morning-glory is found on serpentine or gabbroic soils in openings in chaparral and cismontane woodland communities within elevations between 800 and 1,600 feet.

BOGG'S LAKE HEDGE-HYSSOP

Bogg's Lake hedge-hyssop is State listed as endangered. This species is not Federally listed. The species does not occur in the project area and therefore will not be affected. The nearest locations are north of the project area in Rio Linda and south of the project area in Rancho Cordova and Folsom. Bogg's Lake hedge-hyssop is found on clay soils in areas of shallow water, and lake and vernal pool margins.

PINE HILL CEANOTHUS

Pine Hill ceanothus is Federally listed as endangered and is State listed as rare. This species does not occur in the project area and therefore will not be affected. One population of Pine Hill ceanothus occurs in the canyon of the South Fork of the American River east of Folsom Reservoir, at an elevation of approximately 1,000 feet. Most of the populations occur out of the project area in the area between Pine Hill and Cameron Park. Fewer than 10 occurrences are known, most on private land, but a small portion of the habitat is part of DFG's Pine Hill Ecological Reserve.

PINE HILL FLANNELBUSH

Pine Hill flannelbush is Federally listed as endangered and is State listed as rare. This species does not occur in the project area and therefore will not be affected. The nearest occurrences are on and in the immediate vicinity of Pine Hill. Pine Hill flannelbush is endemic to Pine Hill and the nearby foothills of the Sierra Nevada in El Dorado County. Since it was first described in 1965, six sightings have been reported.

COLUSA GRASS

Colusa grass is Federally listed as threatened and State listed as endangered. This species does not occur in the project area and therefore will not be affected. The nearest known locality is at the U.S. Air Force Communications Facility near Davis, more than 10 miles southwest of the confluence of the American and Sacramento Rivers. Currently, Colusa grass is found in Merced, Solano, and Stanislaus Counties below 700 feet elevation.

SLENDER ORCUTT GRASS

Slender Orcutt grass is Federally listed as threatened and State listed as endangered. This species does not occur in the project area and therefore will not be affected. The nearest occurrence is approximately 8 miles south of Nimbus Dam in the vicinity of Laguna Creek. Slender Orcutt grass occurs in vernal pools within valley grassland and blue oak woodland. It has also shown an ability to colonize artificial habitats, such as the margins of stockponds. Slender Orcutt grass is known from numerous widely distributed, disjunct populations in Lake, Sacramento, Shasta, Siskiyou, and Tehama Counties. Of the approximately 45 known occurrences, about 40 are still extant. Most of the remaining populations are in Shasta and Tehama Counties (Stone et al. 1988).

SACRAMENTO ORCUTT GRASS

Sacramento Orcutt grass is Federally and State listed as endangered. This species does not occur in the project area and therefore will not be affected. The nearest occurrence is approximately 8 miles south of Nimbus Dam in the vicinity of Laguna Creek. Sacramento Orcutt grass is endemic to Sacramento County. Only nine historical and recent occurrences are documented, all in the eastern part of the county. The species remains at about seven known sites. Sacramento Orcutt grass also occurs in vernal pools in grassland and blue oak woodland communities.

HARTWEG'S GOLDEN SUNBURST

Hartweg's golden sunburst is Federally listed and State listed as endangered. There are no records for this species in the project area and the Service's February 2000 species list indicated that this species may be extirpated from the area. Therefore this species will not be affected by the project.

Hartweg's golden sunburst is found on the eastern side of Sacramento-San Joaquin Valleys and adjacent foothills and historically as far north as Yuba County. This species is

predominantly found on northern slopes of rocky, bare areas along rolling hills, shady creeks, adjacent to vernal pools and streams, on heavy clay soils in grasslands, between 50 and 500 feet.

ALEUTIAN CANADA GOOSE

The Aleutian Canada goose is Federally listed as a threatened species. This species is not State listed. This species is a winter resident in the Central Valley, where it generally resides in two localized areas in central California, one near Modesto and Los Banos, and the other near Colusa (Hofman et al. 1986). The only potential wintering habitat for the Aleutian Canada goose in the project area is in the Yolo Bypass. Although no records were found of their occurrence in the area, it is possible that the species occasionally uses the Yolo Bypass while traveling south toward the Modesto area.

The project could result in slight changes in flow conditions along the Lower American River and Sacramento River, as well as the Yolo and Sacramento Bypasses. These changes in flow would not affect the Aleutian Canada goose because the species is not sensitive to such changes.

BALD EAGLE

The bald eagle is Federally listed as threatened and State listed as an endangered species. The bald eagle is a wintering species in the project area. There are no records of bald eagles nesting in or near the project area. The nearest known bald eagle nest is at Union Valley Reservoir, which is the southernmost known bald eagle nesting area in the Sierra Nevada (California Natural Diversity Database 2000). Changes in water storage levels in Folsom Reservoir or increased frequency of inundation in the Yolo and Sacramento Bypasses would not result in a substantial change to bald eagle use of these areas during winter.

YELLOW-BILLED CUCKOO

The yellow-billed cuckoo is a State-listed endangered species. This species is not Federally listed. This species does not occur in the project area and because habitat conditions are unsuitable for the yellow-billed cuckoo. In 1986 and 1987, DFG conducted field surveys to determine the statewide distribution and population size for the cuckoo. Breeding pairs were found only along the Sacramento River in Butte, Glenn, and Colusa Counties; along the Feather River in Sutter County; along the south fork of the Kern River; and along the Santa Ana, Armargosa, and lower Colorado Rivers. In addition, in 1992 one breeding pair of cuckoos was found along Toe Drain (Butte Slough) in the lower Sutter Bypass in Sutter County, and two breeding pairs were found in 1993 in the same area (Jones & Stokes file data).

MOUNTAIN PLOVER

The mountain plover is Federally listed as proposed threatened and is State listed as a species of special concern. This species does not breed in California; however, it winters from central California south through southern Arizona, central Texas, and north-central Mexico (Cogswell 1977). There are no records of mountain plover use in the project area. The American and Sacramento Rivers are unsuitable nesting and foraging habitats for the mountain plover. The agricultural fields in the Yolo Bypass are probably suitable foraging habitats. Mountain plovers may occur irregularly in the Yolo Bypass.

Water storage changes during winter months in the Yolo and Sacramento Bypasses as a result of the project could result in changes in the frequency of inundation of potential agricultural foraging habitats for mountain plovers. However, this is not expected to substantially alter occasional mountain plover use of the bypass or adversely affect the species.

WESTERN SNOWY PLOVER

The coastal subspecies of western snowy plover is Federally listed as threatened and is State listed as a species of special concern. The inland subspecies is not Federally listed but is a State-listed species of special concern.

The inland subspecies may occasionally nest in the Yolo Bypass, however it typically nests at inland lakes throughout northeastern, central, and southern California. Western snowy plovers winter along the California coast from Del Norte to San Diego County. Construction-related activities associated with the Stepped Release Plans are not likely to affect western snowy plovers.

NORTHERN SPOTTED OWL

The northern spotted owl is Federally listed as threatened and is State listed as a species of special concern. The northern spotted owl is a subspecies of the spotted owl (*Strix occidentalis*). A second subspecies, the California spotted owl, replaces the northern spotted owl south of the Pit River and east of the Coast Ranges. This species was identified on the February 2001 species list provided by the Service (Appendix B).

In California, the northern spotted owl is found in the north Coast, Klamath, and western Cascade Range from Del Norte County to Marin County. This species is a permanent resident throughout its range where it lives in dense old-growth forests dominated by conifers with topped trees or oaks available for nesting crevices. There are no unsuitable nesting or foraging habitats for the northern spotted owl in the project area.

SECTION 16

CITATIONS

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PERSONAL COMMUNICATIONS

Fisher, Frank. Fisheries biologist. California Department of Fish and Game, Red Bluff, CA. August 9, 1989 - telephone conversation.

Smith, Jim. Project leader. U.S. Fish and Wildlife Service, Red Bluff, CA. June 2 and August 8, 1989 - telephone conversations.

APPENDIX A

U.S. FISH AND WILDLIFE SERVICE SPECIES LISTS FOR THE AMERICAN RIVER WATERSHED INVESTIGATON

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W2605
Sacramento, California 95825

IN REPLY REFER TO:
1-1-00-SP-3077

October 13, 2000

Patricia Roberson
Department of the Army
US Army Engineer District, Sacramento
1325 J Street
Sacramento, California 95814-2922

Subject: Species Lists for the American River Watershed Investigation

Dear Ms. Roberson:

We are sending the enclosed list in response to your September 14, 2000, request for information about endangered and threatened species (Enclosure A). This list fulfills the requirement of the Fish and Wildlife Service (Service) to provide species lists under section 7(c) of the Endangered Species Act of 1973, as amended (Act).

The animal species shown on Enclosure A are ones we believe may occur within, *or be affected by projects within*, the USGS quads where your project is planned. The plants on the list are ones *that have actually been observed* in the project quads. Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them. Birds are shown regardless of whether they are resident or migratory.

If a species has been listed as threatened or endangered by the State of California, but not by us nor by the National Marine Fisheries Service, it will appear on your list as a Species of Concern. *However you must contact the California Department of Fish and Game for official information about these species.* Call (916) 322-2493 or write Marketing Manager, California Department of Fish and Game, Natural Diversity Data Base, 1416 Ninth Street, Sacramento, California 95814.

Some of the species listed in Enclosure A may not be affected by the proposed action. A trained biologist or botanist, familiar with the habitat requirements of the listed species, should determine whether these species or habitats suitable for them may be affected. For plants, we recommend using the enclosed Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species (Enclosure C).

Some pertinent information concerning the distribution, life history, habitat requirements, and published references for the listed species is available upon request. This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Enclosure B for a discussion of the responsibilities Federal agencies have under section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal

agency or its designated non-Federal representative.

Formal consultation, under 50 CFR § 402.14, should be initiated if you decide that a listed species may be affected by the proposed project. If you decide that a proposed species may be adversely affected, you should consider requesting a conference with our office under 50 CFR § 402.10. Informal consultation may be used before a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office.

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as *critical habitat*. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal. Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, this will be noted on the species list. Maps and boundary descriptions of the critical habitat may be found in the *Federal Register*. The information is also reprinted in the *Code of Federal Regulations* (50 CFR 17.95).

Candidate species are being reviewed for possible listing. Contact our office if your biological assessment reveals any candidate species that might be adversely affected. Although they currently have no protection under the Endangered Species Act, one or more of them could be proposed and listed before your project is completed. By considering them from the beginning, you could avoid problems later. Your list may contain a section called *Species of Concern*. This term includes former *category 2 candidate species* and other plants and animals of concern to the Service and other Federal, State and private conservation agencies and organizations. Some of these species may become candidate species in the future.

We appreciate your concern for endangered species. Please contact Harry Mossman, Biological Technician, at (916) 414-6674, if you have any questions about the attached list or your responsibilities under the Endangered Species Act. For the fastest response to species list requests, address them to the attention of Mr. Mossman at this address. You may fax requests to him at 414-6710 or email them to harry_mossman@fws.gov.

Sincerely,

Ken Sanchez

For Karen J. Miller
Chief, Endangered Species Division

Enclosures

ENCLOSURE A

Endangered and Threatened Species That May Occur in or be Affected by Projects in the U.S.G.S. 7½ Minute Quads Listed at the End of This Report

American River Watershed Investigation

October 11, 2000

Listed Species

Mammals

riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E)
(May be extirpated from all or part of this area.)

riparian brush rabbit, *Sylvilagus bachmani riparius* (E)
(May be extirpated from all or part of this area.)

Birds

Aleutian Canada goose, *Branta canadensis leucopareia* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Critical habitat, delta smelt, *Hypomesus transpacificus* (T)

delta smelt, *Hypomesus transpacificus* (T)

Central Valley steelhead, *Oncorhynchus mykiss* (T)

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

Conservancy fairy shrimp, *Branchinecta conservatio* (E)

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

delta green ground beetle, *Elaphrus viridis* (T)

vernal pool tadpole shrimp, *Lepidurus packardi* (E)

Plants

Stebbins' morning-glory, *Calystegia stebbinsii* (E)

Pine Hill ceanothus, *Ceanothus roderickii* (E)

palmate-bracted bird's-beak, *Cordylanthus palmatus* (E)

El Dorado bedstraw, *Galium californicum ssp. sierrae* (E)

Colusa grass, *Neostapfia colusana* (T)

Antioch Dunes evening-primrose, *Oenothera deltoides ssp. howellii* (E)

Sacramento Orcutt grass, *Orcuttia viscida* (E)

Layne's butterweed, *Senecio layneae* (T)

Solano grass, *Tuctoria mucronata* (E)

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Fish

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (PX)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

spotted bat, *Euderma maculatum* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

western burrowing owl, *Athene cunicularia hypugea* (SC)

Swainson's hawk, *Buteo Swainsoni* (CA)

ferruginous hawk, *Buteo regalis* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

greater sandhill crane, *Grus canadensis tabida* (CA)

black rail, *Laterallus jamaicensis coturniculus* (CA)

white-faced ibis, *Plegadis chihi* (SC)

bank swallow, *Riparia riparia* (CA)

Reptiles

silvery legless lizard, *Anniella pulchra pulchra* (SC)

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

San Joaquin coachwhip (=whipsnake), *Masticophis flagellum ruddocki* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)

river lamprey, *Lampetra ayresi* (SC)

Pacific lamprey, *Lampetra tridentata* (SC)

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Antioch Dunes anthicid beetle, *Anthicus antiochensis* (SC)

Sacramento anthicid beetle, *Anthicus sacramento* (SC)

Sagehen Creek goracean caddisfly, *Goeracea oregona* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

South Forks ground beetle, *Nebria darlingtoni* (SC)

Plants

Suisun Marsh aster, *Aster lentus* (SC)

Ferris's milk-vetch, *Astragalus tener var. ferrisiae* (SC)
(May be extirpated from all or part of this area.)

alkali milk-vetch, *Astragalus tener var. tener* (SC)
(May be extirpated from all or part of this area.)

brittlescale, *Atriplex depressa* (SC)

valley spearscale, *Atriplex joaquiniana* (SC)
(May be extirpated from all or part of this area.)

Red Hills soaproot, *Chlorogalum grandiflorum* (SC)

adobe lily, *Fritillaria pluriflora* (SC)

Northern California black walnut, *Juglans californica var. hindsii* (SC)
(May be extirpated from all or part of this area.)

delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)

Mason's lilaeopsis, *Lilaeopsis masonii* (SC)

valley sagittaria, *Sagittaria sanfordii* (SC)
(May be extirpated from all or part of this area.)

El Dorado mule-ears, *Wyethia reticulata* (SC)

U.S.G.S. 7 ½ minute quads used	Quad#
FOLSOM	511B
ROCKLIN	527C
PILOT HILL	527D
AUBURN	527A
CITRUS HEIGHTS	512A
CARMICHAEL	512D
SACRAMENTO EAST	512C
SACRAMENTO WEST	513D
KNIGHTS LANDING	529C
GRAYS BEND	513B
DAVIS	513C
CLARKSBURG	497A
SAXON	497B
LIBERTY ISLAND	497C
RIO VISTA	480B
ISLETON	480A
JERSEY ISLAND	480C

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(MB)	*Migratory Bird*	Migratory bird
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
	Critical Habitat	Area essential to the conservation of a species.

Enclosure B

FEDERAL AGENCIES' RESPONSIBILITIES UNDER SECTIONS 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) Consultation/Conference

Requires: (1) federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species; (2) Consultation with FWS when a federal action may affect a listed endangered or threatened species to insure that any action authorized, funded, or carried out by a federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The process is initiated by the federal agency after determining the action may affect a listed species; and (3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) Biological Assessment-Major Construction Activity[1]

Requires federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action[2] on listed and proposed species. The process begins with a Federal agency requesting from FWS a list of proposed and listed threatened and endangered species. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may proceed; however, no construction may begin.

We recommend the following for inclusion in the BA: an on-site inspection of the area affected by the proposal which may include a detailed survey of the area to determine if the species or suitable habitat is present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirement; interviews with experts, including those within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of indirect effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, and problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

---

[1] A construction project (or other undertaking having similar physical impacts) which is a major federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332(2)C).

[2] "Effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.

Enclosure C

GUIDELINES FOR CONDUCTING AND REPORTING BOTANICAL INVENTORIES FOR FEDERALLY LISTED, PROPOSED AND CANDIDATE PLANTS

(September 23, 1996)

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations(s) is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

   a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species

   b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name

   c. survey dates and survey methodology(ies)

   d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made

   e. a comprehensive list of all vascular plants occurring on the project site for each habitat type

   f. current and historic land uses of the habitat(s) and degree of site alteration

   g. presence of target species off-site on adjacent parcels, if known.

h. an assessment of the biological significance or ecological quality of the project site in a local and regional context

5. If target species is(are) found, report results that additionally include:

   a. a map showing federally listed, proposed and candidate species distribution as they relate to the proposed project

   b. if target species is (are) associated with wetlands, a description of the direction and integrity of flow of surface hydrology. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors.

   c. the target species phenology and microhabitat, an estimate of the number of individuals of each target species per unit area; identify areas of high, medium and low density of target species over the project site, and provide acres of occupied habitat of target species. Investigators could provide color slides, photos or color copies of photos of target species or representative habitats to support information or descriptions contained in reports.

   d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of target habitat.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.

7. Report as an addendum to the original survey, any change in abundance and distribution of target plants in subsequent years. Project sites with inventories older than 3 years from the current date of project proposal submission will likely need additional survey. Investigators need to assess whether an additional survey(s) is (are) needed.

8. Adverse conditions may prevent investigator(s) from determining presence or identifying some target species in potential habitat(s) of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. An additional botanical inventory(ies) in a subsequent year(s) may be required if adverse conditions occur in a potential habitat(s). Investigator(s) may need to discuss such conditions.

9. Guidance from California Department of Fish and Game (CDFG) regarding plant and plant community surveys can be found in Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities, 1984. Please contact the CDFG Regional Office for questions regarding the CDFG guidelines and for assistance in determining any applicable State regulatory requirements.

APPENDIX B

U.S. FISH AND WILDLIFE SERVICE SPECIES LIST FOR LEVEE MODIFICATIONS ON FOLSOM DAM RESERVOIR, LOWER AMERICAN RIVER, SACRAMENTO BYPASS, AND THE YOLO BYPASS

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
1-1-01-SP-0973

February 6, 2001

Mr. Mark S. Capik
Acting Chief, Planning Division
Department of the Army
U. S. Army Engineer District , Sacramento
Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Subject: Species List for Levee Modifications on Folsom Dam Reservoir, Lower American River, Sacramento Bypass, and the Yolo Bypass, Sacramento, Sutter and Yolo Counties, California

Dear Mr. Capik:

We are sending the enclosed list in response to your January 26, 2001, request for information about endangered and threatened species (Enclosure A). The list does not cover any U.S. Geological Survey 7½ minute quad or quads per your request for county update only.

Please read *Important Information About Your Species List* (enclosed). It explains how we made the list and describes your responsibilities under the Endangered Species Act. Please contact Harry Mossman, Biological Technician, at (916) 414-6674, if you have any questions about the attached list or your responsibilities under the Endangered Species Act. For the fastest response to species list requests, address them to the attention of Mr. Mossman at this address. You may fax requests to him at 414-6712 or 6713.

Sincerely,

for Karen J. Miller
Chief, Endangered Species Division

Enclosures

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute *quads*. The United States is divided into these quads, which are about the size of San Francisco. If you requested your list by quad name or number, that is what we used. Otherwise, we used the information you sent us to determine which quad or quads to use.

Animals

The animals on your species list are ones that occur within, *or may be affected by projects within*, the quads covered by the list. Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.

Plants

Any plants on your list are ones *that have actually been observed* in the quad or quads covered by the list. We have also included either a county species list or a list of species in nearby quads. We recommend that you check your project area for these plants. Plants may exist in an area without ever having been detected there.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. For plant surveys, we recommend using the enclosed *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species*. The results of your surveys should be published in any environmental documents prepared for your project.

State-Listed Species

If a species has been listed as threatened or endangered by the State of California, but not by us nor by the National Marine Fisheries Service, it will appear on your list as a Species of Concern. *However you should contact the California Department of Fish and Game for official information about these species.* Call (916) 322-2493 or write Marketing Manager, California Department of Fish and Game, Natural Diversity Data Base, 1416 Ninth Street, Sacramento, California 95814.

Your Responsibilities Under the Endangered Species Act

All plants and animals identified as *listed* on Enclosure A are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the *take* of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt,

shoot, wound, kill, trap, capture, or collect" any such animal. Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

> If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a *formal consultation* with the Service. Such consultation would result in a *biological opinion* addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.
>
> If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an *incidental take permit*. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project. Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that mitigates for the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the mitigation plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as *critical habitat*. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Maps and boundary descriptions of the critical habitat may be found in the *Federal Register*. The information is also reprinted in the *Code of Federal Regulations* (50 **CFR** 17.95).

Candidate Species

We recommend that you address impacts to *candidate* species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Your list may contain a section called *Species of Concern*. This term includes former *category 2*

candidate species and other plants and animals of concern to the Service and other Federal, State and private conservation agencies and organizations. Some of these species may become candidate species in the future.

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed, candidate and special concern species in your planning, this should not be a problem. We also continually strive to make our information as accurate as possible. Sometimes we learn that a particular species has a different range than we thought. This should not be a problem if you consider the species on the county or surrounding-quad lists that we have enclosed. If you have a long-term project or if your project is delayed, please feel free to contact us about getting a current list. You can also find out the current status of a species by going to the Service's Internet page: *www.fws.gov*

GUIDELINES FOR CONDUCTING AND REPORTING BOTANICAL INVENTORIES FOR FEDERALLY LISTED, PROPOSED AND CANDIDATE PLANTS
(September 23, 1996)

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

    a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species

    b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name

    c. survey dates and survey methodology(ies)

    d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made

    e. a comprehensive list of all vascular plants occurring on the project site for each habitat type

    f. current and historic land uses of the habitat(s) and degree of site alteration

    g. presence of target species off-site on adjacent parcels, if known

    h. an assessment of the biological significance or ecological quality of the project site in a local and regional context

5. If target species is(are) found, report results that additionally include:

   a. a map showing federally listed, proposed and candidate species distribution as they relate to the proposed project

   b. if target species is (are) associated with wetlands, a description of the direction and integrity of flow of surface hydrology. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors.

   c. the target species phenology and microhabitat, an estimate of the number of individuals of each target species per unit area; identify areas of high, medium and low density of target species over the project site, and provide acres of occupied habitat of target species. Investigators could provide color slides, photos or color copies of photos of target species or representative habitats to support information or descriptions contained in reports.

   d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of target habitat.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.

7. Report as an addendum to the original survey, any change in abundance and distribution of target plants in subsequent years. Project sites with inventories older than three years from the current date of project proposal submission will likely need additional survey. Investigators need to assess whether an additional survey(s) is (are) needed.

8. Adverse conditions may prevent investigator(s) from determining presence or identifying some target species in potential habitat(s) of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. An additional botanical inventory(ies) in a subsequent year(s) may be required if adverse conditions occur in a potential habitat(s). Investigator(s) may need to discuss such conditions.

9. Guidance from California Department of Fish and Game (CDFG) regarding plant and plant community surveys can be found in Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities, 1984. Please contact the CDFG Regional Office for questions regarding the CDFG guidelines and for assistance in determining any applicable State regulatory requirements.

ENCLOSURE A

Endangered and Threatened Species that May Occur in or be Affected by Projects in the Area of the Following California Counties

Reference File No. 01-SP-0973

February 6, 2001

SACRAMENTO COUNTY

Listed Species

Mammals

riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *

Birds

Aleutian Canada goose, *Branta canadensis leucopareia* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

Critical habitat, delta smelt, *Hypomesus transpacificus* (T)

delta smelt, *Hypomesus transpacificus* (T)

Central Valley steelhead, *Oncorhynchus mykiss* (T)

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T)

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

Conservancy fairy shrimp, *Branchinecta conservatio* (E)

vernal pool tadpole shrimp, *Lepidurus packardi* (E)

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

delta green ground beetle, *Elaphrus viridis* (T)

Plants

Antioch Dunes evening-primrose, *Oenothera deltoides ssp. howellii* (E)

Sacramento Orcutt grass, *Orcuttia viscida* (E)

slender Orcutt grass, *Orcuttia tenuis* (T)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Species of Concern

Mammals

pale Townsend's big-eared bat, *Corynorhinus (=Plecotus) townsendii pallescens* (SC)
Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)
greater western mastiff-bat, *Eumops perotis californicus* (SC)
small-footed myotis bat, *Myotis ciliolabrum* (SC)
long-eared myotis bat, *Myotis evotis* (SC)
fringed myotis bat, *Myotis thysanodes* (SC)
long-legged myotis bat, *Myotis volans* (SC)
Yuma myotis bat, *Myotis yumanensis* (SC)
San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)
San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Birds

Swainson's hawk, *Buteo Swainsoni* (CA)
little willow flycatcher, *Empidonax traillii brewsteri* (CA)
greater sandhill crane, *Grus canadensis tabida* (CA)
black rail, *Laterallus jamaicensis coturniculus* (CA)
bank swallow, *Riparia riparia* (CA)
American peregrine falcon, *Falco peregrinus anatum* (D)
Black-Crowned Night Heron, *Nycticorax nycticorax* (MB)
tricolored blackbird, *Agelaius tricolor* (SC)
grasshopper sparrow, *Ammodramus savannarum* (SC)
short-eared owl, *Asio flammeus* (SC)
western burrowing owl, *Athene cunicularia hypugea* (SC)
American bittern, *Botaurus lentiginosus* (SC)
ferruginous hawk, *Buteo regalis* (SC)
black tern, *Chlidonias niger* (SC)
lark sparrow, *Chondestes grammacus* (SC)
hermit warbler, *Dendroica occidentalis* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)
Pacific-slope flycatcher, *Empidonax difficilis* (SC)

loggerhead shrike, *Lanius ludovicianus* (SC)
Lewis' woodpecker, *Melanerpes lewis* (SC)
long-billed curlew, *Numenius americanus* (SC)
white-faced ibis, *Plegadis chihi* (SC)
rufous hummingbird, *Selasphorus rufus* (SC)
red-breasted sapsucker, *Sphyrapicus ruber* (SC)
Brewer's sparrow, *Spizella breweri* (SC)
Bewick's wren, *Thryomanes bewickii* (SC)

Reptiles

silvery legless lizard, *Anniella pulchra pulchra* (SC)
northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
southwestern pond turtle, *Clemmys marmorata pallida* (SC)
California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)
western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)
river lamprey, *Lampetra ayresi* (SC)
Kern brook lamprey, *Lampetra hubbsi* (SC)
Pacific lamprey, *Lampetra tridentata* (SC)
longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Antioch Dunes anthicid beetle, *Anthicus antiochensis* (SC)
Sacramento anthicid beetle, *Anthicus sacramento* (SC)
San Joaquin dune beetle, *Coelus gracilis* (SC)
curved-foot hygrotus diving beetle, *Hygrotus curvipes* (SC)
California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Plants

Suisun Marsh aster, *Aster lentus* (SC)
valley spearscale, *Atriplex joaquiniana* (SC)
Tuolumne coyote-thistle, *Eryngium pinnatisectum* (SC)
Ahart's rush, *Juncus leiospermus var. ahartii* (SC)
delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)
legenere, *Legenere limosa* (SC)
Mason's lilaeopsis, *Lilaeopsis masonii* (SC)
valley sagittaria, *Sagittaria sanfordii* (SC)

Northern California black walnut, *Juglans californica var. hindsii* (SC) *

SUTTER COUNTY

Listed Species

Birds

Aleutian Canada goose, *Branta canadensis leucopareia* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

delta smelt, *Hypomesus transpacificus* (T)

Central Valley steelhead, *Oncorhynchus mykiss* (T)

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T)

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

Conservancy fairy shrimp, *Branchinecta conservatio* (E)

vernal pool tadpole shrimp, *Lepidurus packardi* (E)

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Plants

Hartweg's golden sunburst, *Pseudobahia bahiifolia* (E) *

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Species of Concern

Mammals

pale Townsend's big-eared bat, *Corynorhinus (=Plecotus) townsendii pallescens* (SC)
Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)
Marysville Heermann's kangaroo rat, *Dipodomys californicus eximius* (SC)
greater western mastiff-bat, *Eumops perotis californicus* (SC)
small-footed myotis bat, *Myotis ciliolabrum* (SC)
long-eared myotis bat, *Myotis evotis* (SC)
fringed myotis bat, *Myotis thysanodes* (SC)
long-legged myotis bat, *Myotis volans* (SC)
Yuma myotis bat, *Myotis yumanensis* (SC)
San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Birds

Swainson's hawk, *Buteo Swainsoni* (CA)
little willow flycatcher, *Empidonax traillii brewsteri* (CA)
greater sandhill crane, *Grus canadensis tabida* (CA)
bank swallow, *Riparia riparia* (CA)
American peregrine falcon, *Falco peregrinus anatum* (D)
Black-Crowned Night Heron, *Nycticorax nycticorax* (MB)
grasshopper sparrow, *Ammodramus savannarum* (SC)
short-eared owl, *Asio flammeus* (SC)
western burrowing owl, *Athene cunicularia hypugea* (SC)
American bittern, *Botaurus lentiginosus* (SC)
ferruginous hawk, *Buteo regalis* (SC)
black tern, *Chlidonias niger* (SC)
lark sparrow, *Chondestes grammacus* (SC)
black swift, *Cypseloides niger* (SC)
hermit warbler, *Dendroica occidentalis* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)
least bittern, western, *Ixobrychus exilis hesperis* (SC)
loggerhead shrike, *Lanius ludovicianus* (SC)
Lewis' woodpecker, *Melanerpes lewis* (SC)
long-billed curlew, *Numenius americanus* (SC)
white-faced ibis, *Plegadis chihi* (SC)
rufous hummingbird, *Selasphorus rufus* (SC)
Bewick's wren, *Thryomanes bewickii* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

San Joaquin coachwhip (=whipsnake), *Masticophis flagellum ruddocki* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)

western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)

river lamprey, *Lampetra ayresi* (SC)

Pacific lamprey, *Lampetra tridentata* (SC)

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Antioch Dunes anthicid beetle, *Anthicus antiochensis* (SC)

Sacramento anthicid beetle, *Anthicus sacramento* (SC)

Sacramento Valley tiger beetle, *Cicindela hirticollis abrupta* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Plants

Ferris's milk-vetch, *Astragalus tener var. ferrisiae* (SC) *

veiny monardella, *Monardella douglasii ssp. venosa* (SC) *

YOLO COUNTY

Listed Species

Birds

Aleutian Canada goose, *Branta canadensis leucopareia* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

northern spotted owl, *Strix occidentalis caurina* (T)

Reptiles

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

Critical habitat, delta smelt, *Hypomesus transpacificus* (T)

delta smelt, *Hypomesus transpacificus* (T)

Central Valley steelhead, *Oncorhynchus mykiss* (T)

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T)

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

Conservancy fairy shrimp, *Branchinecta conservatio* (E)

vernal pool tadpole shrimp, *Lepidurus packardi* (E)

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Plants

palmate-bracted bird's-beak, *Cordylanthus palmatus* (E)

Solano grass, *Tuctoria mucronata* (E)

Colusa grass, *Neostapfia colusana* (T)

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Birds

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

greater sandhill crane, *Grus canadensis tabida* (CA)

bank swallow, *Riparia riparia* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

Black-Crowned Night Heron, *Nycticorax nycticorax* (MB)

grasshopper sparrow, *Ammodramus savannarum* (SC)
short-eared owl, *Asio flammeus* (SC)
western burrowing owl, *Athene cunicularia hypugea* (SC)
American bittern, *Botaurus lentiginosus* (SC)
ferruginous hawk, *Buteo regalis* (SC)
Lawrence's goldfinch, *Carduelis lawrencei* (SC)
Vaux's swift, *Chaetura vauxi* (SC)
black tern, *Chlidonias niger* (SC)
lark sparrow, *Chondestes grammacus* (SC)
olive-sided flycatcher, *Contopus cooperi* (SC)
hermit warbler, *Dendroica occidentalis* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)
common loon, *Gavia immer* (SC)
least bittern, western, *Ixobrychus exilis hesperis* (SC)
loggerhead shrike, *Lanius ludovicianus* (SC)
Lewis' woodpecker, *Melanerpes lewis* (SC)
long-billed curlew, *Numenius americanus* (SC)
white-faced ibis, *Plegadis chihi* (SC)
rufous hummingbird, *Selasphorus rufus* (SC)
red-breasted sapsucker, *Sphyrapicus ruber* (SC)
Bewick's wren, *Thryomanes bewickii* (SC)
California thrasher, *Toxostoma redivivum* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
southwestern pond turtle, *Clemmys marmorata pallida* (SC)
San Joaquin coachwhip (=whipsnake), *Masticophis flagellum ruddocki* (SC)
California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)
western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)
river lamprey, *Lampetra ayresi* (SC)
Pacific lamprey, *Lampetra tridentata* (SC)
longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Antioch Dunes anthicid beetle, *Anthicus antiochensis* (SC)

Sacramento anthicid beetle, *Anthicus sacramento* (SC)

brownish dubiraphian riffle beetle, *Dubiraphia brunnescens* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Plants

alkali milk-vetch, *Astragalus tener var. tener* (SC)

brittlescale, *Atriplex depressa* (SC)

valley spearscale, *Atriplex joaquiniana* (SC)

Snow Mountain buckwheat, *Eriogonum nervulosum* (SC)

adobe lily, *Fritillaria pluriflora* (SC)

drymaria dwarf-flax, *Hesperolinon drymarioides* (SC)

Hall's madia, *Madia hallii* (SC)

Ferris's milk-vetch, *Astragalus tener var. ferrisiae* (SC) *

Northern California black walnut, *Juglans californica var. hindsii* (SC) *

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	Other species of concern to the Service.
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
*	*Extirpated*	Possibly extirpated from the area.
**	*Extinct*	Possibly extinct
	Critical Habitat	Area essential to the conservation of a species.